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March 31, 2020

Mr. Chan Pongkhamsing
EPA Remedial Project Manager
U.S. EPA Region 10
1200 Sixth Avenue, ECL 111
Seattle, WA 98101

RE: Millersburg Operations Groundwater Remedial Action Progress Summary Year 2019

Dear Mr. Pongkhamsing:

Please find the enclosed copy of the *Millersburg Operations Groundwater Remedial Action Progress Summary Year 2019*. Please let me know if you'd like a hard copy of the report mailed to you.

A placeholder is in the report for the statistical analyses, outlining the general approach ATI is proposing. While working through the actual analyses, we identified several scenarios, such as (1) the handling of fluctuating non-detects, and (2) slightly increasing trends orders of magnitude below the cleanup level, that we would like to discuss with EPA and DEQ prior to completing the analyses. If everyone is available, I would like to start the discussion next week (week of April 6th).

If you have any questions, please feel free to contact me at 541.812.7376.

Sincerely,

Noel Mak
NPL Program Coordinator

Enclosures: 1. *Millersburg Operations Groundwater Remedial Action Progress Summary Year 2019*

# Millersburg Operations Groundwater Remedial Action Progress Summary Year 2019

March 2020

*Prepared by*

GSI Water Solutions, Inc.

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# Abbreviations and Acronyms

| | |
|---|---|
| µg/L | microgram/liter |
| AMP | attainment monitoring phase |
| Apex | Apex Laboratories LLC |
| ATI | Allegheny Technologies Incorporated |
| AWQC | ambient water quality criteria |
| bgs | below ground surface |
| COC | constituent of concern |
| CSM | conceptual site model |
| CVOC | chlorinated volatile organic compound |
| DCA | 1,1-dichloroethane |
| DCE | 1,1-dichloroethene |
| Dhb | *Dehalobacter* |
| Dhc | *Dehalococcoides* |
| DEQ | Oregon Department of Environmental Quality |
| DNAPL | dense nonaqueous-phase liquid |
| EDD | electronic data deliverable |
| EISB | enhanced in situ bioremediation |
| EPA | U.S. Environmental Protection Agency |
| ESD | explanation of significant differences |
| FCCA | Former Crucible Cleaning Area |
| FMA | Feed Makeup Area |
| FYR | Five-Year Review |
| GETS | groundwater extraction and treatment system |
| GSI | GSI Water Solutions, Inc. |
| MCL | maximum contaminant level |
| MIBK | methyl isobutyl ketone |
| MG | million gallons |
| mg/L | milligram/liter |
| MNA | monitored natural attenuation |
| ORP | oxidation-reduction potential |
| OU | operable unit |
| PCE | tetrachloroethene |

| | |
|---|---|
| PSM/RMP | Process Safety Management and Risk Management Plan |
| QA | quality assurance |
| QAPP | quality assurance project plan |
| QC | quality control |
| RI/FS | remedial investigation and feasibility study |
| RMP | remediation monitoring phase |
| ROD | record of decision |
| SEA | South Extraction Area |
| TCA | 1,1,1-trichloroethane |
| TCE | trichloroethene |
| TM | technical memorandum |
| VC | vinyl chloride |

# SECTION 1: **Background and Current Site Conditions**

ATI Millersburg Operations, formerly known as the Teledyne Wah Chang facility, is an active facility operated by Allegheny Technologies Incorporated (ATI). The facility manufactures zirconium, hafnium, and other nonferrous metals, and is located at 1600 Old Salem Road NE in Millersburg, Oregon (Site).

## 1.1 Background

The Site is approximately 225 acres and is located in the southern portion of Millersburg, Oregon. The Site consists of the Main Plant, the Solids Area, and the Farm Ponds Area (Figure 1). The Willamette River and Interstate 5 lie near the western and eastern boundaries, respectively, of the Main Plant. A number of investigation subareas are located on the Main Plant (Figure 2). In addition, several surface water bodies are adjacent to or transit the Main Plant, including Murder Creek, along the northwest perimeter, and Truax Creek, which runs through the Main Plant and forms the boundary between the Fabrication and Extraction Areas.

The Site is divided into the following main areas and investigation subareas:

**Main Plant (90 acres)**

- Extraction Area (40 acres)
  - Feed Makeup Area (FMA)
  - South Extraction Area (SEA)
- Fabrication Area (50 acres)
  - Acid Sump Area
  - Ammonium Sulfate Storage Area
  - Material Recycling Area
  - Dump Master Area
  - Former Crucible Cleaning Area (FCCA)
  - East Perimeter Area

**Solids Area (20 acres)**

**Farm Ponds Area (115 acres)** — approximately 0.75 miles north of the Main Plant

- Farm Ponds (74 acres)
- Soil Amendment Area (41 acres), which the City of Millersburg owns as of 1994.

The Site was listed on the National Priorities List (NPL) in 1983, and ATI entered into a Consent Order and Agreement in 1997 for remediation of soil, sediment, and groundwater. During the remedial investigation and feasibility study (RI/FS), various constituents of concern (COCs) were identified on the Site, including chlorinated volatile organic compounds (CVOCs), ammonia/ammonium, fluoride, metals, nitrate, and radionuclides (CH2M Hill, 1993).

Zircon sand, once used during the manufacturing process, is the source of radionuclides at the Site. Much of the zircon sand has been excavated and removed from the Site, but some radionuclides still remain. The presence of CVOCs is associated with historical use of trichloroethene (TCE) and 1,1,1-trichloroethane (TCA). Use of TCE and TCA at the facility was discontinued in 1982 and 1988, respectively, with the exception of TCE use under government contract at a subsection of the facility until the early 2000s. Use of these chemicals on-site is prohibited.

## 1.2 Regulatory Framework

U.S. Environmental Protection Agency (EPA) organized the Site into three operable units (OU), and issued a record of decision (ROD) for each OU:

- OU1 – Sludge Ponds (in the Solids Area)
- OU2 – Groundwater and Sediment
- OU3 – Surface and Subsurface Soils

This report focuses on groundwater (OU2). The OU2 ROD[1] (EPA, 1994) set forth cleanup levels for groundwater at the Site, which are either listed in Table 10-1 of the OU2 ROD or equal to the EPA maximum contaminant level (MCL) if a chemical is not listed in Table 10-1.

In 1996, EPA issued an Explanation of Significant Differences (ESD; EPA, 1996) to the OU2 ROD that:

1. Changed the groundwater containment requirements along the western and northern perimeters from the ROD cleanup level to surface water ambient water quality criteria (AWQC).
2. Modified the compliance boundary at the Farm Ponds Area from the edge of the former ponds to the property boundary. This change was made so that compliance boundaries were consistently applied across the Site.

In addition to these changes to the OU2 ROD (i.e., as described in the ESDs), there is no longer a cleanup level for manganese at the Site.[2]

## 1.3 Current Site Conditions

The OU2 ROD specified groundwater pump-and-treat as the remedial alternative for hot-spot areas across the Site (EPA, 1994). Between October 2000 and April 2002, the groundwater extraction and treatment systems (GETS) were brought online in the Fabrication and Extraction Areas, and have continued to operate, with modifications over the years, through 2019. More GETS details are presented in Section 3.

In addition to the GETS, ATI has completed multiple remedial activities in several areas (Figures 1 and 2):

- Acid Sump Area: enhanced in situ bioremediation (EISB) injections in 2009; excavation and in situ chemical oxidation in 2016.
- Farm Ponds Area: closure of ponds and excavation of lime solids between 1995 and 1999; pond dikes were leveled and area was regraded to current topography in 2001. Additional excavation of berm material encompassing National Pollutant Discharge Elimination System wells SS and SD was conducted in 2012.
- Feed Makeup Area (FMA): injections of buffer solutions to mitigate low pH groundwater in 2013.

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[1] EPA. 1994. Record of Decision Declaration, Decision Summary, and Responsiveness Summary for Final Remedial Action of Groundwater and Sediments Operable Unit, Teledyne Wah Chang Albany Superfund Site, Millersburg, Oregon. June 10.

[2] The OU2 ROD Table 10-1 based the cleanup level for manganese on the secondary MCL (EPA, 1994), which is a nonmandatory water quality guideline for aesthetic (i.e., taste, color, odor) purposes. Table 10-1 notes state that the Safe Drinking Water Act MCLs, nonzero maximum contaminant level goal, or Oregon drinking water standards would apply as a cleanup level. In 2010, the Oregon Environmental Quality Commission revised Oregon's manganese water quality criteria by removing (1) the "water and fish ingestion" criterion and (2) the "fish consumption only" criterion for freshwaters; these changes were approved by EPA in 2011 (DEQ, n.d.). As the OU2 ROD manganese cleanup level is based on a non-enforceable secondary MCL and Oregon removed all manganese freshwater fish consumption criteria, ATI understands there is no cleanup level for manganese at the Site.

- Former Crucible Cleaning Area (FCCA): EISB injections in 2010 and 2019.
- Solids Area: excavation of waste material by the early 1990s; former Schmidt Lake (now Cell 3) excavated and lined in 2010.
- South Extraction Area (SEA): EISB injections in 2008.

Institutional controls are implemented across the Site that prevent exposure to COCs above the cleanup levels through deed restrictions on groundwater use, zoning, and access controls.

Groundwater and surface water are monitored biannually in the Main Plant (Fabrication and Extraction Areas), and annually in the Solids and Farm Ponds Areas, as outlined in the Quality Assurance Project Plan for Site-Wide Remedial Actions (QAPP; GSI, 2015). See Section 4 for more groundwater and surface water monitoring details.

## 1.4 Conceptual Site Model

This section presents a simplified conceptual site model (CSM) of the Site. A detailed CSM is presented in the RI/FS (CH2M Hill, 1993).

Subsurface soils at the Site are divided into four geologic units. From deepest (oldest) to shallowest (youngest), the units are:

- The **Spencer Formation** is Eocene in age and consists of a 2,500-foot-thick sequence of massive marine sandstone, siltstone, and mudstone with interbedded volcanic flows and tuffs (Baker, 1988).[3] The depth to the top of the Spencer Formation at ATI is highly irregular due to an erosional period that occurred after deposition, and occurs at a depth of 5 feet bgs to over 35 feet (ft) below ground surface. With a hydraulic conductivity ranging from 0.01 to 0.00001 ft per day (ft/day) at the Site, the Spencer Formation is considered an aquitard (CH2M Hill, 1993).
- The **Blue Clay**, deposited by lakes or rivers, unconformably overlies the Spencer Formation and is found within its topographic lows (i.e., the Blue Clay is absent where the Spencer Formation was a topographic high [CH2M Hill, 1993]). On boring logs, the Blue Clay is described as a blue silt, clayey sandy silt, clayey silt, or silty clay. With a hydraulic conductivity of about 0.00045 ft/day, the Blue Clay is considered an aquitard (CH2M Hill, 1993).
- The **Linn Gravel** is an alluvial fan deposited by streams draining the Cascade Mountains (CH2M Hill, 1993; Crenna and Yeats, 1994) between about 28,000 and 36,000 years before present (Roberts, 1984). The Linn Gravel is typically described on boring logs as a silty to sandy gravel with interbeds of silt and sand. It occurs under both confined and unconfined conditions (depending on location) and exhibits a saturated thickness ranging from 14 to 19 ft. The geometric mean hydraulic conductivity of the Linn Gravel varies by area, with values of 2.1 ft/day (Fabrication Area), 3.4 ft/day (Extraction Area), 5.7 ft/day (Farm Ponds Area), and 28 ft/day (Solids Area) (CH2M Hill, 1993). The Linn Gravel is the primary water-bearing unit at the Site. In general, monitoring wells designated with an 'A' (e.g., PW-99A) are completed in the Linn Gravel.
- The **Willamette Silt** is composed of fine-grained sediments that settled out of floodwaters that inundated the Willamette Valley more than 19,000 years ago (Glenn, 1965; O'Connor et al., 2001). The Willamette Silt is described as a brown silt with occasional thin sand interbeds; in the Farm Ponds area, a lower unit described as a gray silt, clayey silt, or clay is also present. The Willamette Silt occurs under unconfined conditions. In general, monitoring wells designated with an 'S' (e.g., PW-105S) are completed in the Willamette Silt.

[3] Thickness is near Dallas, Oregon, about 20 miles northwest of Millersburg.

Groundwater at the Site occurs at an average depth of approximately 10 ft below ground surface (bgs). The groundwater system at the Site is recharged by precipitation and inflow from upgradient of the Site. Groundwater at the Site discharges to surface water bodies, though in some cases the discharge is via adjacent properties. Conceptual site cross sections developed as part of the Remedial Investigation across the extraction area, fabrication area, and solids areas are included in Appendix A for review (CH2M Hill, 1993).

## 1.5 Documents Submitted in 2019

The list below summarizes the reports and technical memorandums (TM) submitted to EPA and Oregon Department of Environmental Quality (DEQ) in 2019.

- Acid Sump Area Source Area Remedial Design Work Plan (July 2019)
  - Work plan was revised based on EPA and DEQ comments and submitted in February 2020.
- Extraction Area Groundwater Remedial Action Progress Summary – Year 2018 (March 2019)
- Fabrication Area Groundwater Remedial Action Progress Summary – Year 2018 (April 2019)
- Farm Ponds Area Groundwater Remedial Action Progress Summary – Year 2018 (March 2019)
- Farm Ponds Area Groundwater Remedial Action Progress Summary – Year 2018, Revised (August 2019)
- Former Crucible Cleaning Area Enhanced In Situ Bioremediation String 3 Operations Plan (June 2019)
- Former Crucible Cleaning Area Enhanced In Situ Bioremediation String 3 Operations Plan, Revised (August 2019)
- Revised Groundwater Sampling Schedule and Sitewide Exceedance Analysis Report (June 2019)
- Solids Area Groundwater Remedial Action Progress Summary – Year 2018 (March 2019)

# SECTION 2: **Remedial Activities and Status**

Since the Site was listed on the NPL, a tremendous amount of work has gone into characterizing contamination, removing wastes and contaminated media, operating the GETS, and performing additional remediation projects throughout the Site. This section summarizes the most recent recommendations from EPA and DEQ, and provides the status for new and ongoing remedial activities at the Site in 2019.

## 2.1 Summary of Regulatory Recommendations

### 2.1.1 Five-Year Review

Every five years, EPA evaluates the implementation and performance of the remedy at the Site to determine if it is still protective of human health and the environment in a Five-Year Review (FYR). The latest FYR was published in December 2017 and includes a table of issues and recommendations in Section 6 of the FYR (EPA, 2017). These issues and recommendations have been summarized in Table 1, along with the status of each recommendation.

### 2.1.2 Optimization Review

In 2019, EPA performed a Remedial Process Optimization Study and published an Optimization Review Report (EPA, 2019). The Optimization Review Report included a useful overview of the Site and several valuable recommendations. ATI supported almost all of the recommendations and discussed the implementation and schedule of the optimization recommendations with EPA and DEQ in a January 2020 meeting (GSI, 2020a). A summary of the recommendations, actions, and schedule are provided in Table 2. No optimization recommendations were implemented in 2019, but several were discussed and approved in the annual meeting with EPA, DEQ, and ATI in January 2020, and implemented in this report:

- Added AWQC criteria along the northern and western perimeters to applicable COC figures (recommendation 5.2.1).
- COC data analysis and data evaluation of remediation status (called an attainment analysis in the Optimization Review Report) methods (recommendations 5.8.1 and 5.9.3, respectively).
- Prepared a single water level map across the Main Plant and Solids Area (recommendation 5.9.1).
- Prepared a comprehensive annual report for the Site rather than separate reports per area (i.e., Fabrication, Extraction, Solids, and Farm Ponds) (recommendation 5.9.2). Due to the distance between the Farm Ponds Area and the Main Plant/Solids Area, both geographically and hydraulically, the annual progress summary for the Farm Ponds Area will be submitted as a standalone TM.

### 2.1.3 Previous Year's Annual Report Regulatory Comments

EPA provided comments on two of the four 2018 annual reports, the Extraction Area and Farm Ponds Area progress summaries. DEQ had comments on one of the four 2018 annual reports, the Farm Ponds Area progress summary. Those comments related to the Farm Pond Area are discussed in the 2019 standalone TM.

The Extraction Area comment recommended continued monitoring in the SEA due to a vinyl chloride (VC) exceedance in PW-96A (Ravi Sanga, email communication, May 10, 2019). To address this comment, ATI sampled PW-96A in the spring and fall monitoring events in 2019. Additionally, previously unaddressed comments were revisited in the 2018 EPA comments regarding the source of fluoride in the FMA and V-2 Pond area and a request for a fluoride surface water sample to be collected in Second Lake. Based on the

1996 ESD, the applicable standard for Second Lake is the AQWC human health and fish consumption standard. However, there is not an established AQWC human health and fish consumption standard for fluoride, and consequently a fluoride surface water sample from Second Lake is not warranted at this time.

## 2.2 Remedial Activities in 2019

Two remedial actions were conducted in 2019 to address remaining source material or to evaluate the remedial approach. These included:

- **Feed Makeup Area (FMA):** hydraulic testing in the FMA to enhance the GETS effectiveness at reducing the radium-226 and radium-228 concentrations in PW-28A and EW-2.
- **Former Crucible Cleaning Area (FCCA)**: performing EISB injections in the FCCA to address rebounding TCA concentrations.

### 2.2.1 FMA

Technical details about hydraulic testing in the FMA are provided in Appendix B. As a part of hydraulic testing, ATI turned off extraction wells EW-1 and EW-3 and evaluated two scenarios for pumping EW-2 to enhance the effectiveness of groundwater extraction in the FMA:

- Pumping extraction well EW-2 at a constant rate for 24 hours per day to focus capture on the most contaminated groundwater in the FMA.
- Pulse-pumping extraction well EW-2, such that the well pumped for 16 hours followed by an 8-hour rest period, to minimize groundwater stagnation and provide an opportunity for contaminants sorbed to soil to partition into groundwater when soil is rewetted.

### 2.2.2 FCCA

Since the first round of EISB injections in 2010, the CVOC concentrations have been monitored in FCCA monitoring wells (e.g., PW-93A, PW-94A, PW-95A, and PW-100A). As reported in the 2018 Fabrication Area Groundwater Remedial Action Progress Summary (GSI, 2019a), TCA concentrations had been detected above the cleanup level at monitoring wells PW-94A, PW-95A, and PW-100A. Additionally, EPA had highlighted the elevated concentrations in the FCCA in the Fifth FYR (Table 1; EPA, 2017). To address this, ATI performed a third optional string of EISB injections, which were initially proposed in the 2010 Work Plan (GSI, 2010).

A revised FCCA EISB String 3 Operations Plan (GSI, 2019b) was submitted and approved by EPA, and implemented in August 2019. As outlined in the Operations Plan, approximately 20,000 gallons of deoxygenated water with 125 parts per million of food-grade 60 percent sodium lactate was combined with an additional 5 percent concentration of Newman Zone substrate and injected into 10 temporary injection wells. Halfway through the injection of deoxygenated water, sodium lactate, and Newman Zone, about 2 kilograms of KB-1 Plus culture (*Dehalococcoides* [Dhc] and *Dehalobacter* [Dhb]) was injected into each temporary injection well. DEQ was onsite during the KB-1 Plus injections. A 14-month performance monitoring period follows the EISB injections and includes three analytical groundwater monitoring events and two Dhc/Dhb assays at PW-93A (GSI, 2019b). This performance-monitoring period will end in October 2020.

### 2.2.3 Acid Sump Area

Despite dramatically reduced concentrations of CVOCs in the Acid Sump Area since the 2009 EISB injections, recent groundwater quality data suggest that a persistent source of dense nonaqueous-phase liquid (DNAPL) may remain. ATI plans to implement additional remediation in the Acid Sump Area. To efficiently and cost effectively implement the remediation, further source area investigation and remediation feasibility analysis are necessary to fill data gaps.

Prior to EPA's Remedial Process Optimization Study, ATI submitted a work plan to investigate and delineate (to the extent feasible) the extent of the source zone in the Acid Sump Area (GSI, 2019c). A revised work plan was written in response to EPA and DEQ comments, but submittal was delayed to allow for EPA's Optimization Review Report to be published and recommendations to be discussed with EPA and DEQ before final submittal of the revised work plan in February 2020. See Section 7.1 for more details about upcoming work related to the Acid Sump Area.

## 2.3 Facility Operations and Maintenance

As an operating facility, ATI Millersburg Operations conducts operations and maintenance activities that have the potential to positively or negatively impact the protectiveness in the remedy. A summary of those activities for 2019 is presented here:

- **Spills**: There were no spills that would impact the remedy in 2019.
- **Tank Management**: Visual inspections, as required under the facility Process Safety Management and Risk Management Plan (PSM/RMP) program, for ammonia and chlorine were conducted. No nonconformances were identified. No tanks were replaced in 2019.
- **Chemical Piping Management**: Visual inspections, as required under the facility PSM/RMP program, for ammonia and chlorine were conducted. No failures were identified. Minor areas of paint damage were identified on several ammonia system lines. These were repainted in 2019.
- **Underground Water Lines**: A major leak on an 8-inch water main was identified in August 2019 just southwest of PW-69A. The line was taken out of service until it could be repaired in October 2019.

# SECTION 3: **GETS Operations**

The OU2 ROD specified groundwater pump-and-treat as the remedy for hot-spot areas at the Site (EPA, 1994). In 2000, the groundwater extraction and treatment system (GETS) began operating with extraction wells FW-1, FW-2, FW-3, FW-4, and FW-5 in the Fabrication Area and EW-1, EW-2, EW-3, EW-4, EW-5, and EW-6 in the Extraction Area. FW-6 was not incorporated in the GETS due to insufficient water production. Extraction well FW-7 was brought online in 2001 to prevent offsite migration but was shut down in April 2009 with EPA approval. Extraction wells EW-4, EW-5, and EW-6 were shut down in 2011 with EPA approval.

## 3.1 GETS Performance

Since the GETS began operating, 800,000 to 2.3 million gallons of water a month has been pumped from the aquifer (Table 3). In 2019, extraction wells EW-1 and EW-3 were taken out of operation as part of the FMA hydraulic test (see Section 2.2.1 and Appendix B). Through the operation of the GETS, ammonium, fluoride, nickel, total dissolved solids, radium-226/228, and CVOCs are removed from the aquifer. Table 4 presents the amount of COC mass removed in 2019.

Over the lifespan of the GETS, the quantity of COC mass removed by extraction wells FW-1, FW-2, FW-3, and FW-4 in the Fabrication Area has diminished from original quantities, as indicated by the COC concentrations in extracted water (Tables 5a through 5k). EPA questioned whether these four extraction wells were providing any environmental benefit and recommended that ATI consider a shutdown test in the Optimization Review Report (EPA, 2019). ATI concurs with EPA's recommendation and is moving forward with a shutdown pilot test (see Section 7.3 for more details).

The environmental benefit of extractions wells EW-1, EW-2, and EW-3 in the Extraction Area was also reviewed as part of the FMA hydraulic test (see Section 6.3.3 and Appendix B). As discussed in Section 6.3.3, the results of the hydraulic tests indicate that pumping only EW-2 continuously provides the same or better radium mass removal relative to pumping EW-1, EW-2, and EW-3 together. Overall, however, very little mass is being removed using the system, and a total of only $1.2 \times 10^{-8}$ pounds of radium was removed over the last three years. Further evaluation is warranted to determine modifications to the remedial approach needed to reach cleanup goals in the FMA.

## 3.2 GETS Operations and Maintenance

The active extraction wells in the GETS are serviced, at a minimum, quarterly throughout year. This service includes flushing, cleaning, repairing, and/or replacing (if necessary) the flow meters and pumps. After noting extremely low flows at EW-2 in mid-April, the discharge line between the pump and GETS manifold was replaced on April 25 due to a clog in the line.

Additionally, extraction wells FW-1, FW-2, FW-3, FW-4, FW-5, and EW-2 were rehabilitated in the beginning of June. This process included (1) flushing the discharge line from the pump via the manifold to the cooling tower, and (2) brushing, vacuuming, surging, and vacuuming the well again. The development was completed by Cascade Drilling and Sure-Flow, Inc., with oversight by GSI Water Solutions, Inc. (GSI).

# SECTION 4: **Groundwater and Surface Water Monitoring Activity Summary**

The Fabrication and Extraction Areas monitoring events occur biannually, in the spring and the fall. The Solids Area monitoring event occurs annually in August. Tables 6a and 6b display the sample schedule for the spring and fall monitoring events, respectively. Additionally, actively pumping extraction wells were sampled quarterly in 2019. Figure 3 shows the groundwater well and surface water locations at the Main Plant and Solids Area. The well construction details are provided in Appendix C. As the Farm Ponds Area is not hydraulically connected to the Main Plant and Solids Area, the 2019 monitoring event is discussed in a separate TM.

## 4.1 Spring Monitoring Event

The spring event occurred between April 23 and May 14 in the Extraction and Fabrication Areas, and included the following monitoring:

- Extraction Area
  - Synoptic groundwater levels at 21 wells
  - Groundwater samples at 3 extraction wells and 10 monitoring wells
- Fabrication Area
  - Synoptic groundwater levels at 70 wells
  - Groundwater samples at 3 extraction wells and 55 monitoring wells
  - Surface water samples at 5 locations

## 4.2 August Monitoring Event

The annual Solids Area monitoring event occurred between August 15 and August 22, and included the following monitoring:

- Solids Area
  - Synoptic groundwater levels at 17 wells
  - Groundwater samples at 16 monitoring wells

## 4.3 Fall Monitoring Event

The fall event occurred between October 2 and October 30 in the Extraction and Fabrication Areas, and included the following monitoring:

- Extraction Area
  - Synoptic groundwater levels at 23 wells
  - Groundwater samples at 3 extraction wells and 10 monitoring wells
- Fabrication Area
  - Synoptic groundwater levels at 70 wells
  - Groundwater samples at 5 extraction wells and 56 monitoring wells
  - Surface water samples at 5 locations

## 4.4 Deviations from QAPP

The QAPP outlines the sampling process design, including the monitoring schedule in Table B-1 (GSI, 2015). The following are deviations from the QAPP:

- Due to the tight fit of the pump in the extraction wells, the pump needs to be removed from the well casing to collect a groundwater level measurement. Therefore, groundwater level measurements were not collected from actively pumping extraction wells during the spring and fall monitoring events.
- During the spring monitoring event, groundwater level measurements were not collected at extraction wells EW-1 and EW-3. Although the pumps were not actively pumping water, the pumps would have needed to be pulled to collect the water level measurement, which was not done.
- During the first quarter extraction well event, extraction wells FW-2 and FW-5 were not sampled because the dedicated pumps in the wells were not operational.
- During the third quarter extraction well event, extraction well FW-2 was not sampled because the dedicated pump in the wells was not operational. Additionally, extraction well FW-5 was not sampled during the third quarter because of low water levels in the well; operation at this extraction well is often suspended during the dry summer months.
- Monitoring well PW-09 was not sampled in August because of insufficient water in the well.
- In 2016, a sitewide sampling event was conducted with additional constituents analyzed that are not routine for the biannual and annual groundwater monitoring events (GSI, 2018). Some wells had cleanup level exceedances for constituents not included in the biannual and annual groundwater monitoring. These constituents were resampled in 2017 and 2018 for verification and evaluation purposes, with the results included in the 2018 groundwater remedial action progress summaries for the Fabrication, Extraction, Solids, and Farm Ponds Areas (GSI, 2019a, 2019d, 2019e, and 2019f, respectively). Constituents that exceeded the cleanup level in the 2017 or 2018 confirmation samples were sampled again in 2019 along with the constituents listed in the QAPP Table B-1.

# SECTION 5: **Groundwater and Surface Water Monitoring Results**

This section discusses the results of the monitoring activities listed in Section 4. Similarly, the 2019 Farm Ponds Area monitoring event is discussed in a separate TM.

## 5.1 Groundwater Flow

Groundwater level measurements and the calculated groundwater elevations from the 2019 spring and fall monitoring events are shown in Table 7. A shallow groundwater contour map showing conditions during the fall 2019 monitoring event is provided as Figure 4. Groundwater levels were measured with the extraction wells pumping, with the exceptions of: (1) EW-1 and EW-3, shut down due to the FMA hydraulic test, and (2) FW-1, shut down (for the fall event) due to the August EISB injections in the FCCA. A groundwater divide is present, trending generally east–west from the northern side of Cell 3 to the Acid Sump Area to the Duraflake Particle Board Facility.

Overall, shallow groundwater is present at approximately 10 ft below ground surface and flows north-northwest from the divide toward Murder Creek and south-southwest toward Truax Creek. In the Solids Area, groundwater flows southwest toward the Willamette River at a gradient ranging from approximately 0.02 to 0.03 ft/ft. In the Fabrication Area, the groundwater flows northwest toward Murder Creek at a gradient of approximately 0.016 ft/ft or southwest towards Truax Creek at a gradient of about 0.02 ft/ft. In the Extraction Area, the groundwater flows southwest toward Second Lake or northeast toward Truax Creek under a gradient of about 0.02 ft/ft.

## 5.2 Data Quality Evaluation

Groundwater monitoring in 2019 was completed in conformance with the QAPP, except as described in Section 4.4. All samples were immediately placed in iced coolers and maintained under chain-of-custody protocols. ATI or GSI personnel delivered samples to the laboratory (Apex Laboratories LLC in Tigard, Oregon [Apex]) during collection periods.

Duplicate samples for field quality control (QC) were collected at a frequency of 5 percent of the samples collected during the event. All duplicate samples were collected at the same time as the parent sample and were blind-labeled and delivered to Apex with the normal shipment. Matrix spike and matrix spike duplicate samples also were collected at a frequency of 5 percent and when potential changes in the sample matrix were anticipated because of previous sampling results. Apex provided the use of approved analytical methods according to the QAPP, analytical data package deliverables, and conformance with the laboratory's quality assurance (QA) manual.

Field and laboratory data were subjected to a formal verification and validation process in accordance with EPA guidance documents, as described in the QAPP. QA/QC Solutions, LLC, an external party, as defined in EPA's Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (EPA, 2009), performed the data validation to determine the usability of the data for meeting project objectives. An abbreviated validation review (i.e., a summary review of the results reported) was performed on 90 percent of the data and a more comprehensive validation review was performed on 10 percent of the data, as described in Section D.1 of the QAPP.

Data qualifiers were assigned during data validation to the electronic data deliverables (EDDs) when applicable QA and QC limits were not met and the qualification was warranted following guidance specified by EPA (EPA, 2002, 2008, and 2010), QC requirements specified in the QAPP, and method-specific QC requirements, as applicable. Final, qualified (as necessary) laboratory results were transmitted in EDDs for data management, further evaluation, and reporting.

After verification and validation of the field and laboratory data, as described above, data completeness was calculated by comparing the total number of acceptable data (nonrejected data) to the total number of data points generated. Overall, completeness for the 2019 monitoring events was 100 percent (i.e., no data were rejected).

## 5.3 Groundwater Analytical Results

Groundwater analytical results for the primary COCs are discussed below. Tables 6a and 6b display the sample schedule for the spring and fall monitoring events, respectively. Field parameter data from the monitoring events are summarized in Table 8. Analytical data from the quarterly extraction well sampling is presented in Table 9. The extraction and monitoring wells that exceeded a cleanup level in 2019 (either spring or fall monitoring events) are listed in Table 10. The groundwater CVOC results from 2019 are available in Table 11 and historical groundwater results of COCs with cleanup levels are available in Tables 5a through 5k. Similarly, groundwater plumes comparing 2000 (the baseline year) and fall 2019 plumes, and isopleth maps for COCs are displayed in Figures 5a through 14.

### 5.3.1 TCA and Dechlorinated Daughter Compound

The TCA plume has reduced in size significantly when comparing 2000 (the baseline year) to fall 2019. There are three areas with TCA still persisting above cleanup levels: Acid Sump Area, FCCA, and Dump Master Area (Figure 5a).

#### Acid Sump Area

As shown in the TCA isopleth (Figure 5b), there is a high concentration of TCA in the central portion of the Acid Sump Area, potentially centered around well I-2. The TCA concentration in I-2 suggests the presence of DNAPL. A criterion for DNAPL delineation is that groundwater concentrations exceeding 1 percent of a chemical's solubility in water may be indicative of DNAPL (EPA, 1992). Therefore, based on a TCA solubility in water of 1,290,000 micrograms per liter (µg/L) (Horvath et al., 1999), groundwater concentrations exceeding 12,900 µg/L may be indicative of DNAPL. The concentration of TCA in well I-2 in the fall 2019 monitoring event was 22,900 µg/L (Tables 5a and 11). Well I-2 is also the only well at the Site with a cleanup level exceedance of TCA's daughter compound, 1,1-dichloroethane (DCA; Tables 5b, 10, and 11, Figure 6).

#### FCCA

TCA concentrations have decreased between the spring and fall monitoring events in the FCCA as a result of EISB injections conducted in August 2019. Although PW-94A and PW-95A were still exceeding the TCA cleanup level of 200 µg/L in the fall monitoring event, there was a 69 percent and 29 percent reduction in concentrations, respectively, between the spring and fall monitoring events. Concentrations of the daughter product DCA increased in both wells (Tables 5b and 11), which indicates that reductive dechlorination is occurring.

#### Dump Master Area

PW-30A TCA concentrations decreased in 2019 from the increases observed in 2017 and 2018 (Table 5a). Current concentrations are less than 400 µg/L, somewhat above the cleanup level of 200 µg/L. DCA concentrations remain low in this well (Table 5b), and nearby wells all have concentrations of TCA below the cleanup level.

### 5.3.2 PCE and Dechlorinated Daughter Compounds

Historically, tetrachloroethane (PCE) was not used at the facility and was only an impurity in TCE products. It has been detected in only a few wells at levels exceeding the cleanup level of 5 µg/L (Table 5c and Figure 7). In 2019, there were three wells with PCE cleanup level exceedances (Tables 10 and 11 and Figure 7), which are located in the Acid Sump Area and FCCA.

The TCE plume has decreased since the baseline event in 2000, but as of 2019, TCE is still detected in the Acid Sump Area, FCCA, and Ammonium Sulfate Storage Area/Material Recycling Area (Table 5d and Figures 8a and 8b). 1,1-Dichloroethene (DCE), a daughter product of TCE, was historically quite prevalent across most of the Fabrication Area (Figure 9a). As of fall 2019, the DCE plume has reduced in lateral extent and present with TCE in the Acid Sump Area, FCCA, and Ammonium Sulfate Storage Area/Material Recycling Area. DCE is also detected in the Dump Master and East Perimeter Areas (Table 5e and Figures 9a and 9b). The horizontal extent of VC impact has also decreased since 2000 (Figure 10a). VC is now present in the Acid Sump Area, FCCA, Ammonium Sulfate Storage Area/Material Recycling Area, and the East Perimeter Area, where groundwater conditions are suitable for the reductive dechlorination of TCE and DCE (Table 5f and Figures 10a and 10b). Additionally, there is a single VC cleanup level exceedance in the SEA.

#### Acid Sump Area

PCE and all daughter compounds were detected above applicable cleanup levels in the Acid Sump Area in 2019 (Tables 5c through 5f and Figures 7 through 10b). As shown on Figure 9b, the groundwater impact originates in the central portion of the Acid Sump Area, and continues downgradient toward Murder Creek. Perimeter monitoring wells PW-77A and PW-78A do have exceedances of DCE, but do not exceed any other CVOC cleanup level (Table 11). Although the DCE concentrations at the perimeter monitoring wells PW-77A (9.74 µg/L) and PW-78A (43.6 µg/L) exceeded the cleanup level of 7 µg/L (Tables 5e and 11), the concentrations are significantly lower than the AWQC aquatic receptor standard of 11,600 µg/L that applies to Murder Creek (DEQ, 2014a).

#### FCCA

Following the August 2019 EISB injections, the fall 2019 monitoring event demonstrated that the concentrations of CVOCs had generally declined (Table 12). As further discussed in Section 6.3.2, there was a moderate amount of Dhc in PW-93A in October, and aquifer conditions (i.e., dissolved oxygen, ORP, and pH) are favorable for reductive dechlorination to occur (Table 8). There are two more monitoring events associated with the recent EISB injections before a full performance analysis will be completed.

#### Ammonium Sulfate Storage Area and Material Recycling Area

Although the plume is smaller than the 2000 baseline, TCE and daughter compounds DCE and VC exceeded the applicable cleanup levels in multiple wells in 2019 in the Ammonium Sulfate Storage Area and Material Recycling Area (Figures 8a through 10b). Extraction wells FW-2 and FW-5 are downgradient of this plume and have been extracting TCE and low levels of DCE and VC from the aquifer (Tables 5d through 5f).

#### Dump Master Area and East Perimeter Area

Groundwater extraction and reductive dechlorination processes have successfully reduced the lateral extent of the TCE impacts to levels below the cleanup level of 5 µg/L (Figure 8a). The Dump Master Area DCE and VC plumes have also reduced in size, with only VC exceedances remaining (Figures 9a through 10b). Similarly, from 2000 to fall 2019, the extent of DCE and VC impact has decreased in the East Perimeter Area.

#### SEA

TCE was historically present in the SEA. These impacts were addressed using ESIB injections in 2008. The EISB injections were successful in providing the necessary conditions for reductive dechlorination to occur. There is a limited amount of VC remaining in monitoring well PW-96A (Table 5f and Figures 10a and 10b).

### 5.3.3 Ammonium

Only the Ammonium Sulfate Storage Area had an ammonium cleanup level exceedance in 2019, in monitoring well PW-01A (Tables 5g and 10 and Figure 11). This well is downgradient of former wood-stave ammonium storage tanks that were replaced in 2016.

### 5.3.4 Fluoride

Fluoride cleanup level exceedances are shown in Tables 5h and 10 and Figure 12. Groundwater impacts are present in the Acid Sump Area, FCCA, Ammonium Sulfate Storage Area, and FMA. There were no fluoride cleanup level exceedances in the Solids Area. The fluoride concentration at PW-22A (5.02 mg/L) slightly exceeded the cleanup level of 4.0 mg/L in the fall 2019 groundwater sample. This is the first time that a cleanup level exceedance has been observed at PW-22A (Table 5h).

### 5.3.5 Nitrate

Seven wells exceeded the nitrate cleanup level in 2019 (Tables 5i and 10). In the Acid Sump Area, groundwater collected from two monitoring wells (E-11 and I-3) exceeded the cleanup level in the spring event, and one monitoring well (PW-13) slightly exceeded the cleanup level in the fall. Groundwater is impacted with nitrate above cleanup level to the southwest of the Ammonium Sulfate Storage Area, including extraction well FW-5 (Figure 13). Further downgradient of this area, perimeter monitoring well PW-21A had a nitrate cleanup level exceedance. Additionally, a well on the upgradient side of the Site (PW-31A) had a nitrate cleanup level exceedance. The upgradient location of PW-31A likely indicates an upgradient source on adjacent property east of the Union Pacific Railroad track. No nitrate cleanup level exceedances were observed in the Solids Area.

### 5.3.6 Metals

Arsenic, beryllium, and cadmium are analyzed at various wells across Site (Table 5j).

#### Arsenic

Arsenic has been monitored routinely in the FMA since 2000. There has not been an arsenic cleanup level exceedance in this area since spring 2015 (Table 5j).

As a result of the 2016 Sitewide Sampling Event (GSI, 2018), arsenic was recognized as a COC in multiple wells in the Fabrication and Solids Areas. These exceedances were confirmed during the 2018 and 2019 monitoring events. The source of the arsenic has not been determined and is likely due to background concentrations for the region. As part of the Optimization Review Report, EPA recommended that ATI perform an arsenic background study (EPA, 2019). ATI agreed to conduct the study to determine whether the arsenic is the result of facility anthropogenic sources (Table 2) (see Section 7.5 for more details).

#### Beryllium

Beryllium was identified as a COC in two extraction wells and three monitoring wells in the FMA during the 2016 Sitewide Sampling Event (GSI, 2018). The presence of beryllium was confirmed during the 2018 and

2019 monitoring events (Table 5j). All beryllium samples collected in 2019 exceeded the cleanup level of 0.001 mg/L.

#### Cadmium

Cadmium has been a COC in the FMA since 2000 (Table 5j). In 2019, one extraction well (EW-2) exceeded the cadmium cleanup level of 0.005 mg/L in both the spring and fall 2019 monitoring events. Monitoring wells PW-50A and PW-52A, and extraction well EW-1, had detections above the cadmium cleanup level during the spring monitoring event, but were below the cleanup level in the fall monitoring event.

#### Nickel

Nickel has been monitored routinely in the FMA since 2000. Nickel concentrations have not exceeded the cleanup level since fall 2012 (Table 5j).

### 5.3.7 Radium-226/228

Radium-226 and radium-228 are COCs in the FMA and have a combined cleanup goal of 5 picocuries per liter. The combined radium-226/228 FMA plume has decreased since 2000, but still persists in the source area, particularly in monitoring well PW-28A and extraction well EW-2 (Table 5k and Figure 14). As discussed in Section 2.2.1, a hydraulic test to enhance the GETS effectiveness and reduce radium-226/228 concentrations in PW-28A and EW-2 was completed in 2019 and the results are available in Appendix B of this report.

### 5.3.8 Other Constituents of Concern

Pentachlorophenol and cyanide were recognized recently as COCs in select wells in the Extraction, Fabrication, and Solids Area during the 2016 Sitewide Sampling Event (GSI, 2018). Confirmation analysis continued in 2019 (Table 5k).

## 5.4 Surface Water Analytical Results

Surface water samples were collected from Murder Creek and Truax Creek during the spring and fall monitoring events (sampling locations are shown in Figure 3). Field parameters are available in Table 8, and the analytical results are available in Table 13. Low levels of CVOCs were detected in both creeks in downstream samples. In addition, ammonium was detected in Truax Creek upstream and downstream samples, nitrate was detected in Murder Creek in upstream, mid, and downstream samples, and fluoride was detected in Murder Creek in mid and downstream samples. All detections were significantly below DEQ's applicable AWQC for aquatic receptors.

## 5.5 Data Gaps

### 5.5.1 Water Level Gaps

Based on historical groundwater level data, the location of the groundwater divide at the Acid Sump Area can shift during the year. To further define the groundwater flow in this area, ATI proposes collecting additional groundwater data in this area. Transducers will be installed in wells PW-11 and PW-13 (west), PW-98 (north), and PW-99 (south). Monitoring the groundwater level for up to 12 months will help delineate the location of the groundwater divide over each season and the groundwater flow directions.

### 5.5.2 Water Quality Gaps

Based on the 2016 Sitewide Sampling Event (GSI, 2018) and EPA's Optimization Review Report (EPA, 2019), the following COCs have been identified at the listed wells as needing further monitoring:

- Arsenic: EW-1, EW-2, MW-02A, MW-03A, PW-28A, PW-50A, PW-52A, PW-69A, PW-93A, PW-94A, PW-96A, PWB-1, PWB-2, PWE-1
- Beryllium: EW-1, EW-2, PW-50A, PW-52A
- CVOCs: FW-5, PW-81A
- Cyanide: PWF-1, PWF-2
- Fluoride: FW-5, PW-69A, PW-94A, PW-95A
- Methyl isobutyl ketone (MIBK): PW-21A, PW-22A
- Nitrate: FW-5, PW-03A, PW-21A, PW-24A, PW27A, PW-31A, PW-51A
- Pentachlorophenol: EW-3, FW-3, PW-03A, PW-31A, PW-50A, PW-82A, PW-83A
- Radium-226/228: PWB-3
- VC: PW-21A, PW-22A

The above constituents have been added to the 2020 monitoring schedule for the wells listed in addition to a select few perimeter/downgradient wells (GSI, 2020b). ATI will discuss ongoing monitoring of these constituents into 2021 with EPA and DEQ in the next annual meeting.

# SECTION 6: **Data Review and Site Boundary Compliance**

The purpose of this section is to present methods for data review and to evaluate the most recent monitoring data to confirm that the Site remedy is still protective at the compliance boundary (i.e., property boundary) as outlined in EPA's OU2 ROD and 1996 ESD. This involves two steps:

1. Present methods for review of the Site monitoring data for evaluation of remediation status.
2. Evaluate each investigation subarea for protectiveness at the compliance boundary.

## 6.1 Review of Data

Further statistical analysis of the data was requested by DEQ in comments related to the 2018 Farm Ponds report (Ann Farris, email communication, July 11, 2019) and by EPA in the Optimization Review Report (EPA, 2019). EPA recommended that linear regression analysis or the Mann-Kendall test be used to evaluate contaminant trends over time in wells for priority COCs with concentrations exceeding remedial goals (recommendation 5.9.3; EPA, 2019). Additionally, EPA recommended using methods outlined in the existing EPA attainment guidance documents to evaluate COCs on a well-by-well basis to evaluate whether groundwater cleanup requirements have been met (recommendation 5.8.1; EPA, 2019).

### 6.1.1 Monitoring Phases

Each COC at each well goes through two phases: the remediation monitoring phase (RMP) and the attainment monitoring phase (AMP).

- **Remediation Monitoring Phase**
  - The RMP refers to the phase of the remedy where either active (e.g., pump-and-treat) or passive (e.g., monitored natural attenuation [MNA]) remedial activities are being implemented to reach groundwater cleanup levels.
  - A statistical trend analysis is performed for the "driver" constituents to determine whether the remedy is on track.
  - Linear regression analyses can be used to determine estimated time to cleanup.
  - The Mann-Kendall test can be used to determine whether the trend is increasing, stable, or decreasing.
  - The RMP continues until data demonstrate that the groundwater has reached cleanup levels.
  - A minimum of four data points are needed for the analyses.
- **Attainment Monitoring Phase**
  - The AMP occurs after the RMP is complete (i.e., after the data demonstrate that the groundwater has reached cleanup levels set forth in the OU2 ROD) and the area is no longer affected by active remediation activities.
  - The AMP is completed when data show that:
    - The cleanup level for COC has been met; and
    - The groundwater will continue to meet the cleanup level for each COC in the future.
  - A minimum of eight data points will be used in the analyses of trend and concentrations during the AMP.
- **Characterization Wells**
  - Certain wells at the Site have never had a COC analytical result above its corresponding cleanup level. These wells are classified as Characterization wells.

### 6.1.2 COC Data Analysis

For wells in the remediation monitoring phase, statistical trend analysis will be performed for priority COCs at wells with concentrations above remedial goals. Priority COCs are those that exceed the remedial goal by the greatest magnitude (EPA, 2019).

For wells in the attainment monitoring phase, a statistical analysis will be performed on COC concentration trends in accordance with EPA's Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well (Groundwater Restoration Completion Guidance; EPA, 2014). As outlined in the Groundwater Restoration Completion Guidance, each COC with an established cleanup level will be analyzed on a well-by-well basis to evaluate whether the aquifer restoration is complete.

ATI will perform the trend analyses after input from EPA and DEQ on the approach identified above (see Section 7.4 for more details.)

## 6.2 Property Boundary Compliance Criteria

As discussed in Section 1.2, three possible groundwater compliance criteria apply to the property boundary at Main Plant and Solids Area. These are depicted in Figure 3 and include:

- The **EPA MCL** as outlined in the OU2 ROD. This compliance criterion is applied where groundwater is flowing onsite, and where groundwater is flowing offsite and not into a surface water body.
- The surface water **AWQC for aquatic receptors** is applied where groundwater flows from the Site and into a surface water body where the protection of fish and aquatic life is the designated use. This applies to the property boundary along Murder Creek and Truax Creek. These standards are available in DEQ's Table 30, Aquatic Life Water Quality Criteria for Toxic Pollutants, for "freshwater" (DEQ, 2014a).
- The surface water **AWQC for human health and fish consumption** is applied where groundwater flows from the Site and into a surface water body where consumption of drinking water, fish, and shellfish are the designated use. This applies to the property boundary along Second Lake and the Willamette River. These standards are available in DEQ's Table 40, Human Health Water Quality Criteria for Toxic Pollutants, for "water + organism" (DEQ, 2014b).

## 6.3 Remedy Protectiveness at Compliance Boundaries

### 6.3.1 Acid Sump Area

The COCs in the Acid Sump Area are:

- CVOCs
- Fluoride
- Nitrate

Groundwater flows northwest from the center of the Acid Sump Area toward Murder Creek (Figure 4). Perimeter monitoring wells PW-77A and PW-78A had only one cleanup level exceedance, which is DCE at concentrations of 9.74 μg/L and PW-78A 43.6 μg/L, respectively, in fall 2019 (Tables 10 and 11). These concentrations are significantly lower than the AWQC aquatic receptor standard of 11,600 μg/L that applies to Murder Creek (DEQ, 2014a).

ATI has further action planned for the Acid Sump Area to address the TCA, TCE, and associated daughter compounds. As discussed in Section 2.2.3, ATI plans an investigation to delineate the source area in the Acid Sump Area, which will be followed by a remediation feasibility analysis (see Section 7.1 for more details).

There are no fluoride or nitrate AQWC standards for aquatic receptors that would apply to Murder Creek. Additionally, there were no fluoride or nitrate groundwater impacts in a perimeter monitoring well along Murder Creek (Figures 12 and 13, respectively).

Therefore, the remedy is protective of Murder Creek, and ATI will further investigate the source area in the Acid Sump Area.

### 6.3.2 FCCA

The COCs in the FCCA are:

- CVOCs
- Fluoride

As discussed in Section 2.2.2, a round of EISB injections occurred in the FCCA in August 2019 to address TCA, TCE, and associated daughter compound concentrations. A 14-month performance monitoring period follows the EISB injections and includes three analytical groundwater monitoring events and two Dhc/Dhb assays at PW-93A (GSI, 2019b).

By the end of 2019, one analytical groundwater performance monitoring event and one bacteria assay had been completed. The analytical groundwater results are available in Table 12, along with the 2010 baseline concentrations and 2019 baseline concentrations at key monitoring wells. Some observations post EISB injection are:

- Relative to 2019 baseline conditions, TCA concentrations were reduced by approximately 97 percent in PW-69A, 70 percent in PW-93A, 69 percent in PW-94A, 29 percent in PW-95A, and 97 percent in PW-100A.
- PCE and TCE concentrations fluctuated slightly (i.e., by up to a few parts per billion), slightly increasing at some wells (PW-93A, PW-94A, and PW-95A) and slightly decreasing at other wells (PW-69A and PW-100A).
- DCE and VC concentrations increased in wells PW-93A, PW-94A, and PW-95A. Observed increases in these daughter compounds following the EISB injection indicates dechlorination processes are occurring. VC concentrations in monitoring wells PW-100A and PW-101A decreased.
- The Dhc enumeration assay was $10^6$ cells/liter in monitoring well PW-93A, which is considered a “moderate” amount of Dhc concentration as defined by SiREM, which performed the assay and was the source of KB-1 Plus.
- Oxidation–reduction potential (ORP), dissolved oxygen, and pH levels observed in the October 2019 event were all in acceptable ranges to support EISB and reductive dechlorination.

The performance monitoring period will continue through October 2020 and a TM summarizing the results will be submitted to EPA in February 2021.

Groundwater flows in a southeast to southwest direction from the center of the FCCA (Figure 4). Chlorinated solvents and fluoride are detected above the cleanup level only at monitoring wells in the center of the FCCA (Tables 5a through 5h), and there have not been exceedances downgradient of these monitoring wells.

Therefore, impacts are localized and the remedy is protective. ATI will continue monitoring the effects of the August 2019 EISB injections.

### 6.3.3 FMA

The COCs in the FMA are:

- Radium-226/228
- Fluoride
- Metals (arsenic, beryllium, cadmium, and nickel)

Groundwater flows in a southwest direction from the FMA toward Second Lake (Figure 4). Perimeter monitoring wells PW-21A through PW-24A did not have any cleanup exceedances for radium-226/228 or metals in 2019. One perimeter monitoring well (PW-23A) had a fluoride cleanup level exceedance, but there is no fluoride AQWC standard established for human health and fish consumption that would apply to Second Lake.

A hydraulic test was conducted to evaluate alternative pumping strategizes of the GETS to optimization capture of radium-226/228 and acidic groundwater in the FMA. Details of the test can be found in Appendix B.

The remedy is considered protective in the FMA, and ATI will further discuss modifications to the GETS with EPA and DEQ.

### 6.3.4 Ammonium Sulfate Storage Area and Material Recycling Area

The COCs in the Ammonium Sulfate Storage Area and Material Recycling Area are:

- CVOCs
- Ammonium (Ammonium Sulfate Storage Area only)
- Fluoride (Ammonium Sulfate Storage Area only)
- Nitrate (Ammonium Sulfate Storage Area only)

Truax Creek is downgradient of the Ammonium Sulfate Storage Area and Material Recycling Area TCE, DCE, and VC plume (Figure 4). In fall 2019, the wells along Truax Creek and upgradient of the Ammonium Sulfate Storage Area and Material Recycling Area did have cleanup level exceedances of TCE in FW-5 (23.5 μg/L) and PW-89A (19.8 μg/L) (Table 11). However, these concentrations were significantly below the AQWC aquatic receptor standard of 21,900 μg/L.

TCE concentrations have been declining at FW-2 over the course of the remedy and operation of this extraction well may provide only limited environmental benefit (EPA, 2019). As TCE concentrations appear to be increasing in extracted water from FW-5, given the limited data available (Table 5d), this extraction well may possibly provide a better remedy to the plume than FW-2.

An ammonium exceedance occurred at PW-01A, upgradient of extraction well FW-5, which is removing ammonium from the aquifer (Figure 11).

The fluoride plume in the Ammonium Sulfate Storage Area is contained to two wells (FW-5 and PW-89A) as shown in Figure 12. There is no fluoride AQWC standard established for aquatic receptors that would apply to Truax Creek.

A nitrate plume originates in the Ammonium Sulfate Storage Area and reaches the perimeter monitoring well PW-21A (Figure 13). There is no nitrate AQWC standard for aquatic receptor or human health and fish consumption that would apply to Truax Creek or Second Lake, respecitvely

The remedy is protective of Truax and Second Lake. ATI will further investigation into the effectiveness of FW-2 in a GETS shutdown pilot test (more details in Section 7.3).

### 6.3.5 Dump Master Area and East Perimeter Area

The COCs in the Dump Master Area and East Perimeter Area are:

- CVOCs

Truax Creek is downgradient of the Dump Master and East Perimeter Areas (Figure 4). The Dump Master Area extraction well FW-4 has been operating since 2001, with limited extraction of CVOCs over time (Tables 5a through 5f). Following EPA approval, extraction well FW-7 in the East Perimeter Area was shut down in April 2009, and the area is now being addressed using MNA.

Dump Master Area wells PW-75A and PW-91A are upgradient of Truax Creek, and concentrations of COCs in these wells have not exhibited CVOCs exceeding cleanup levels for the last 10 years (Tables 5a through 5f). Monitoring wells MW-07A and MW-08A are upgradient of Truax Creek in the East Perimeter Area and have never had a CVOC detection above the applicable cleanup level (Table 11). Therefore, the remedy is protective of Truax Creek.

### 6.3.6 SEA

The historical COCs in the SEA were TCA, TCE, and associated daughter compounds. ATI successfully performed EISB injections in 2008. As of 2019, there was a single exceedance of VC in monitoring well PW-96A (Table 10). The VC concentration in PW-96A has fluctuated at low levels since the EISB injections, with a concentration of 4.37 µg/L in fall 2019, above the cleanup level of 2 µg/L (Table 5f).

Groundwater flows in a general southwest direction in the SEA toward Second Lake (Figure 4). The monitoring well downgradient of PW-96A is PW-97A, which was last sampled in the fall of 2017, but didn't have a single VC cleanup level exceedance between 2010 and 2017. Therefore, ATI considers the remedy protective.

### 6.3.7 Solids Area

The COCs in the Solids are fluoride, nitrate, and radium-226/228. Cyanide was added as a COC at two wells based on groundwater samples collected during the 2016 Sitewide Sampling Event (GSI, 2018).

Fluoride and radium-226/228 are the only COCs observed in samples collected from monitoring well PWB-3, which is located at the northern edge of ATI's property (Figure 3) and is completed in the Blue Clay. Cyanide is a COC at monitoring wells PWF-1 (completed in the Willamette Silt) and PWF-2 (completed in the Blue Clay), which are just south of Cell 3. Groundwater flows in a southwest to west direction toward the Willamette River (Figure 4). Fluoride, radium-226/228, and cyanide have not exceeded any applicable cleanup levels in downgradient Willamette Silt (PW-09 and PW-18B) and Blue Clay (PWD-2 and PWE-2) monitoring wells. ATI considers the remedy protective.

### 6.3.8 Northwest Extraction Area

EPA identified a data gap in the northwest extraction area, around perimeter monitoring wells PW-21A and PW-22A, in the Optimization Review Report (EPA, 2019). The recommendation discussed the need for further investigations into the source area of contaminants. ATI agreed that further investigation may be warranted and suggested replacing PW-21A. In the January 2020 meeting, EPA, DEQ, and ATI agreed that this is a lower priority considering the significant amount of work currently planned for 2020, and that this area will be discussed in further detail in the 2021 annual meeting (GSI, 2020a).

# SECTION 7: **Conclusions and Proposed Actions**

The 2019 monitoring event results support EPA's conclusion in the Fifth FYR that human health and the environment are protected at the Site (EPA, 2017). COC groundwater concentrations and the horizontal limits of impact have declined significantly across the majority of the facility over the last 20 years as a result of extensive remedial efforts undertaken by ATI. Select areas at the Site need further investigation and remedial action (i.e., Acid Sump Area, FMA) to move the Site toward closure. The tasks ATI plans to undertake in 2020 are outlined below.

## 7.1 Acid Sump Area Investigation

Before undertaking further remedial actions to address the TCE and TCA plume in the Acid Sump Area, ATI recognizes there are gaps in the data needed to inform the nature and scope of the future source remediation. The goals of the work plan ATI submitted in February 2020 were to (1) delineate, to the extent feasible, the source zone in the Acid Sump Area, and (2) determine the radius of influence of injectate that can be introduced to the source zone at a given point, using a tracer test (if groundwater quality data indicate the need for tracer analysis because of DNAPL or high CVOC zones).

ATI plans to conduct the field work associated with the work plan in June 2020. A summary of the findings from the investigation will be provided to EPA in November 2020, and potential source remediation options will be discussed with EPA and DEQ during the annual meeting in January 2021.

## 7.2 FMA System Modifications

Based on the findings from the FMA hydraulic test (Appendix B), GSI recommends turning off extraction wells EW-1 and EW-3, and pumping extraction well EW-2 continuously. GSI also recommends closely tracking flow volumes and radium concentrations to assess the long-term effectiveness of this remedial strategy, and evaluating other remedial methods that are appropriate for low-permeability environments (as discussed in Appendix B, the hydraulic conductivity of the Linn Gravel in the FMA is about 0.4 ft/day). The hydraulic test results and potential remedial approaches to address radium-226/228 in the FMA will be discussed with EPA and DEQ in the second quarter 2020 meeting, tentatively scheduled for May.

## 7.3 GETS Shutdown Pilot Test

ATI supports EPA's Optimization Review Report recommendation to perform a shutdown pilot test at extraction wells FW-1, FW-2, FW-3, and FW-4 (EPA, 2019). A general outline of the pilot test TM was given to EPA and DEQ in February 2020 for their consideration. ATI will submit the GETS shutdown pilot TM to EPA in April 2020, with the goal of obtaining EPA and DEQ approval to begin shutting down the extraction wells in the second quarter of 2020.

## 7.4 COC Data Analysis

COC attainment analysis and COC statistical trends were recommended in the Optimization Review Report (recommendations 5.8.1 and 5.9.3, respectively). Given the huge number of wells at the Site (approximately 138 wells), ATI feels it would be prudent to agree on the COC trend analysis approach before embarking on an extensive evaluation. ATI requests a conference call or virtual meeting in early April to discuss the trend analyses approaches.

## 7.5 Arsenic Background Study

ATI supports EPA's Optimization Review Report recommendation to perform an arsenic background study (EPA, 2019). ATI will discuss the approach of the background study with EPA and DEQ during the third quarter 2020 meeting.

## 7.6 Transducers in Acid Sump Area

Based on historical data, the location of the groundwater divide at the Acid Sump Area can shift during the year. To further define the groundwater flow in this area, ATI proposes collecting additional groundwater data in this area. Transducers will be installed in wells PW-11 and PW-13 (west), PW-98 (north), and PW-99 (south). Monitoring groundwater level for up to 12 months will help delineate the location of the groundwater divide over each season.

# SECTION 8: **References**


Baker, L. J., 1988. The Stratigraphy and Depositional Setting of the Spencer Formation, West-Central Willamette Valley, Oregon: A Surface-Subsurface Analysis. Oregon State University, Corvallis, Master's Thesis, 171 p. Available online at: https://ir.library.oregonstate.edu/downloads/8910k020d.

CH2M Hill. 1993. Remedial Investigation/Feasibility Study—Teledyne Wah Chang Albany.

Crenna, P. A. and R. S. Yeats, 1994. Late Cenozoic Tectonics and Paleogeography of the Salem Metropolitan Area, Central Willamette Valley, Oregon. In: Oregon Geology, Volume 56, Number 6, pp. 129-136.

DEQ. n.d. Arsenic, Iron and Manganese Rulemaking. Oregon Department of Environmental Quality Website: https://www.oregon.gov/deq/wq/Pages/WQ-Standards-Metals.aspx. (accessed March 2020).

DEQ. 2014a. Table 30: Aquatic Life Water Quality Criteria for Toxic Pollutants. https://www.oregon.gov/deq/wq/Pages/WQ-Standards-Toxics.aspx. Oregon Department of Environmental Quality. April 2014.

DEQ. 2014b. Table 40: Human Health Water Quality Criteria for Toxic Pollutants. https://www.oregon.gov/deq/wq/Pages/WQ-Standards-Toxics.aspx. Oregon Department of Environmental Quality. April 2014.

EPA. 1992. Estimating Potential for Occurrence of DNAPL at Superfund Sites. OSWER Publication 9355.4-07FS. National Technical Information Service (NTIS) Order Number PB92-963338CDH.

EPA. 1994. Record of Decision Declaration, Decision Summary, and Responsiveness Summary for Final Remedial Action of Groundwater and Sediments Operable Unit, Teledyne Wah Chang Albany Superfund Site Millersburg, Albany. U.S. Environmental Protection Agency. June 1994.

EPA. 1996. Superfund Explanation of Significant Differences: Teledyne Wah Chang, Albany, OR 10/8/1996. EPA/541/R-97/082. U. S. Environmental Protection Agency. October 1996.

EPA. 2002. Guidance on Environmental Data Verification and Validation. EPA QA/G-8. EPA/240/R-02/004. November 2002.

EPA. 2008. USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review. EPA-540/R-08/01. June 2008.

EPA. 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. EPA 540-R-08-005. U.S. Environmental Protection Agency (EPA). January 2009.

EPA. 2010. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review. EPA-540/R-10/011. January 2010.

EPA. 2014. Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well. OSWER 9283.1-44. U.S. Environmental Protection Agency. August 2014.

EPA. 2017. Fifth Five-Year Review Report for Teledyne Wah Chang Superfund Site Linn County, Oregon. U.S. Environmental Protection Agency. December 2017.

EPA. 2019. Optimization Review Report Remedial Process Optimization Study Teledyne Wah Chang Superfund Site, Millersburg, Linn County, Oregon. U.S. Environmental Protection Agency. November 2019.

Glenn, J. L., 1965. Late Quaternary Sedimentation and Geological History of the North Willamette Valley, Oregon: Corvallis, Oregon State University, Ph. D. Dissertation, 231 p.

GSI. 2010. Former Crucible Cleaning Area Enhanced In Situ Bioremediation Work Plan, ATI Wah Chang Facility, Albany, Oregon. Prepared by GSI Water Solutions, Inc., June 2010.

GSI. 2015. Quality Assurance Project Plan for Site-Wide Remedial Actions. Prepared by GSI Water Solutions, Inc., December 2015.

GSI. 2018. Sitewide Groundwater and Surface Water Sampling Results—2016, Revised. Prepared by GSI Water Solutions, Inc. (GSI). March 2018.

GSI. 2019a. Fabrication Area Groundwater Remedial Action Progress Summary—Year 2018. Prepared by GSI Water Solutions, Inc. April 2019.

GSI. 2019b. Former Crucible Cleaning Area Enhanced In Situ Bioremediation String 3 Operations Plan, Revised. Prepared by GSI Water Solutions, Inc. August 2019.

GSI. 2019c. Acid Sump Area Source Area Remedial Design Work Plan. Prepared by GSI Water Solutions, Inc. July 2019.

GSI. 2019d. Extraction Area Groundwater Remedial Action Progress Summary—Year 2018. Prepared by GSI Water Solutions, Inc. March 2019.

GSI. 2019e. Solids Area Groundwater Remedial Action Progress Summary—Year 2018. Prepared by GSI Water Solutions, Inc. March 2019.

GSI. 2019f. Farm Ponds Area Groundwater Remedial Action Progress Summary—Year 2018, revised. Prepared by GSI Water Solutions, Inc. August 2019.

GSI. 2020a. January 16, 2020 EPA Annual Meeting Notes. Prepared by GSI Water Solutions, Inc. January 2020.

GSI. 2020b. Groundwater Sampling Schedule for 2020. Prepared by GSI Water Solutions, Inc. January 2020.

Horvath, A. L., F. W. Getzen, and Z. Maczynska. 1999. Halogenated ethanes and ethenes with water. *Journal of Physical Chemical Reference Data*. 28(2):395–627.

O'Connor, J. E., Sarna-Wojcicki, A., Wozniak, K. C., Polette, D. J., and R. J. Fleck, 2001. Origin, Extent, and Thickness of Quaternary Geologic Units in the Willamette Valley, Oregon.

Roberts, M. C., 1984. The Late Cenozoic History of an Alluvial Fill—the Southern Willamette Valley, Oregon. In: Mahaney, W. C., ed., Correlation of Quaternary Chronologies: Norwich, Great Britain, Geo Books, p. 491 – 504.

**Table 1. Fifth Five-Year Review Recommendation Status**

*ATI Millersburg Operations, Oregon*

| Operation Unit | Issue Category | Issue | Recommendation | Status |
|---|---|---|---|---|
| OU2 | Remedy Performance | Wah Chang complete source removal and chemical oxidation treatment in the ASA in 2016. Since some source material was left in place and current hot spots remain, the cleanup levels are not expected to be achieved by the timeframe specified in the ROD. | Wah Chang must determine when and if ROD cleanup levels will be achieved, and determine whether additional response actions are needed in order to achieve ROD cleanup levels. | (1) An optimization recommendation (5.2.1) and outcome[1] was to remove the 15-year cleanup level timeframe, as it was not reasonable given site conditions.<br>(2) ATI submitted a source area remedial design work plan to further investigate and delineate the extent of the source area. The investigation is scheduled for June 2020. |
| OU2 | Remedy Performance | Wah Chang implemented EISB in the FCCA, and while there have been reductions in contaminant levels, the trends are inconsistent. Areas of contamination still exceed the ROD cleanup levels. | Wah Chang must evaluate groundwater monitoring data in the FCCA and recommend modifications to reduce contaminant concentration levels. | ATI performed an additional EISB string in August 2019 to address contaminant levels. |
| OU2 | Remedy Performance | Low pH conditions persist in the FMA that contribute to COCs above ROD cleanup levels. ROD cleanup levels will not likely be achieved in 2017. | Wah Chang must evaluate GETS and the current soil flushing regime and improve effectiveness. | ATI recently completed a hydraulic test in the FMA to develop system modifications to accelerate attainment of the COCs. Results from the hydraulic test are in Appendix A of this progress summary. |
| OU2 | Monitoring | Results from the 2016 sitewide monitoring event noted concentrations of manganese, cyanide, arsenic, and radium-226/228 that exceeded ROD cleanup levels in wells not currently in the monitoring program. Of note are exceedances of radium-226/228 concentrations in groundwater from perimeter monitoring well PW-15AR. | Exceedances must be evaluated to determine whether additional wells need to be added to the monitoring program, and whether further measures need to be taken to address the exceedances of the ROD cleanup levels. | (1) All 2016 sitewide monitoring event exceedances have been resampled and results provided in the 2018 progress summaries. If the confirmation sample results were also above the ROD cleanup level, constituents were added to the 2020 monitoring schedule submitted to EPA in January 2020.<br>(2) The confirmation sample for radium-226/228 at PW-15AR was below the combined radium cleanup level. |

**Table 1. Fifth Five-Year Review Recommendation Status**

*ATI Millersburg Operations, Oregon*

| Operation Unit | Issue Category | Issue | Recommendation | Status |
|---|---|---|---|---|
| OU3 | Monitoring | The last FYR noted that tilling for agricultural purposes was being conducted at the SAA. Although the RI/FS determined that agricultural practices did not pose a risk to human health or the environment, EPA is revisiting the issue since it has been more than 20 years since soil radionuclide data were collected and the original evaluation did not address risks to agricultural workers from soil resuspension due to tilling. | Wah Chang must collect and analyze air samples for radium at the next opportunity, to measure the risk to human health and the environment from the disturbance/resuspension of soil and remaining levels of radionuclides in soils. Since earlier testing did not demonstrate human health risk, the City may continue to use the property for agricultural activities. Following EPA's reassessment of the contaminated soils, should there be an indication of human health risk to those exposed to these soils under current agricultural practices, EPA will share those results with the City of Millersburg and discuss appropriate actions for future use of the property. | A personal breathing zone sample was collected by ATI in September 2018 following OSHA approved methods. Due to a lack of particulate recovery in the positive pressure cab, the laboratory was unable to analzye the sample. |

Notes

[1] Optimization recommendations are from the Optimization Review Report Remedial Process Optimization Study Teledyne Wah Chang Superfund Site Millersburg, Linn County, Oregon, EPA Region 10 (2019) and the subsequent outcomes from January 2020 meeting with EPA, DEQ, and ATI.

COC = contaminant of concern
OU = operable unit
DEQ = Oregon Department of Environmental Quality
EISB = enhanced in situ bioremediation
EPA = U.S. Environmental Protection Agency
FCCA = Former Crucible Cleaning Area
FMA = Feed Makeup Area
GETS = groundwater extraction and treatment system
RI/FS = remedial investigation and feasibility study
ROD = record of decision
SAA = Soil Amendment Area

**Table 2. Optimization Recommendation Status**

*ATI Millersburg Operations, Oregon*

| Recommendation | Title | Synopsis | Actions | Schedule |
|---|---|---|---|---|
| 5.1 | Eliminate Redundant Sampling of Previously Excavated Areas | Change the excavation sampling requirements to eliminate the current practice of sampling and evaluating in areas that have been previously excavated and backfilled with clean material. | Excavation information will be provided to EPA and DEQ. Upon review, EPA and DEQ will review the data to determine whether site assessment can be considered complete. Furthermore, data could be used to close the sitewide SWMU. | (1) Data will be provided to EPA and DEQ in April 2020.<br>(2) Results will discussed during the EPA, DEQ, and ATI meeting in May 2020. |
| 5.2.1 | Remedy Approach and Exit Strategy: Eliminate 15-Year Time Horizon to Achieve Cleanup Standards | Modify the 15-year time horizon to achieve cleanup standards, and acknowledge that low levels of contamination in groundwater under portions of the property may exist for decades due to site conditions. | Since many areas are inaccessible, source control will be the focus to minimize potential of offsite migration of constituents of concern (COCs) exceeding applicable standards (see 5.2.2). | No additional administrative action is needed at this time; the decision can be clarified in future decision documents. |
| 5.2.2 | Remedy Approach and Exit Strategy: Clarify/Update RAO Regarding Impacted Groundwater Leaving Property Boundary | Seek clarification of 1996 ESD that if (1) contaminated groundwater discharge is not subject to a 15-year time frame, (2) surface water receiving groundwater discharge is not adversely impacted (e.g., applicable AWQCs are not exceeded), and (3) ICs are in place to prevent exposure, then discharge is allowed under the remedy. | ATI provided a site-wide map showing applicable regulatory limits for each property boundary. Downgradient property lines were shown as being subject to AWQC based on aquatic receptors or human health and fish consumption. | (1) Map will used in progress summaries and other applicable reports.<br>(2) Per EPA, an ESD is not needed; EPA agreed that inclusion of the map in future reports is sufficient. |
| 5.2.3 | Remedy Approach and Exit Strategy: Overall Remedy Approach | Focus activities on identifying and eliminating as much remaining source material as possible. Additionally, pump-and-treat (P&T) should generally not be a priority as a management approach unless it is part of a specific source remediation, provides beneficial mass removal, or is required for hydraulic containment at the property perimeter. | P&T will not be a management approach going forward unless it (1) is part of a specific source remediation, (2) is providing sufficient mass removal, or (3) is required for hydraulic containment to prevent exceedance of AWQC at the property perimeter.<br>Select areas of concern will be addressed on a case-by-case basis. ATI will implement actions to address source areas and move to a sitewide MNA approach. | Ongoing. |
| 5.3 | Modify Extraction Approach at FMA | Seeks a significant modification of the remedial action in the FMA. It includes termination of the current soil flushing approach and replacing the current approach with a recirculation system. | ATI completed the hydraulic testing and water quality sampling in the FMA in December 2019. Based on discussions with EPA and DEQ, the GETS may be modified to accelerate attainment of the COCs. | (1) Results of the FMA hydraulic testing are available in Appendix A of this progress summary.<br>(2) Results and remedial approaches to enhance the GETS will be discussed with EPA and DEQ in the May 2020 meeting. |
| 5.4 | Consider "Shut-Down Tests" at FW-1 to FW-4 | Environmental benefits provided by extraction at pumping wells FW-1, FW-2, FW-3, and FW-4 may be limited. ICs in place prevent human exposure and no additional protectiveness is provided by pumping at these wells. In conjunction with continued efforts to characterize and remediate sources, recommends that "shutdown tests" be conducted to assess changes in water quality without extraction. | ATI will provided a pilot test work plan in support of this recommendation. | A shutdown test work plan will be submitted to EPA and DEQ in April 2020. EPA and DEQ will review the plan within 30 days and pilot test will be implemented upon approval. |
| 5.5 | Enhancement of ASA Source Area Treatment | States the remediation efforts to date at the ASA have resulted in mixed success. To enhance the effectiveness of the current EISB remedy, recommends injecting steam from the nearby steam plant into the subsurface to increase temperature in the contaminated source area to accelerate dechlorination of the dissolved solvents in groundwater. | ATI will perform a source area remedial design work plan to further investigate and delineate the extent of the source area. Based on the findings, a feasibility study will be performed to recommend remedial alternatives. | (1) The remedial design investigation is schedule for June 2020.<br>(2) A summary of the findings from the investigation will be provided in November 2020.<br>(3) Potential remedial alternatives will be discussed in the January 2021 meeting. |
| 5.6.1 | Characterize Potential Sources: Northwest Extraction Area | The presence of contaminants in perimeter wells PW-21A and PW-22A was identified and the conceptual model does not adequately explain the source of these chemicals. Recommends further investigations using direct push sampling, rapid turnaround analytical work, and additional monitoring wells. | Additional source investigation may be warranted. ATI suggested that PW-21A be replaced and that the data from the new well be evaluated to determine next steps. EPA and DEQ agreed that this is a lower priority item considering the significant amount of work currently planned for 2020. | This area will be discussed in further detail in the 2021 annual meeting. |

**Table 2. Optimization Recommendation Status**

*ATI Millersburg Operations, Oregon*

| Recommendation | Title | Synopsis | Actions | Schedule |
|---|---|---|---|---|
| 5.6.2 | Characterize Potential Sources: FCCA | States there may be additional source mass in the FCCA, particularly in the vadose zone. Recommends using direct push sampling for unsaturated soil and groundwater to complete a "three-dimensional" characterization. | An additional EISB injection event occurred in August 2019, followed by a 14-month monitoring phase. | (1) EISB injection results will be discussed during the January 2021 meeting.<br>(2) EISB summary technical memorandum will be submitted in February 2021. |
| 5.7 | Actions at the Farm Ponds Area | Acknowledges redevelopment potential of the Farm Ponds Area and identifies a path to transfer ownership and to remediate the residual groundwater contamination measured in one shallow well (PW-104S). | EPA will issue a Ready for Reuse agreement, which does not preclude delisting the area in the future. ATI has not determined whether the property will be sold, or kept and redeveloped for use by ATI. | (1) Ready for Reuse agreement will be submitted to the EPA risk assessor by January 24, 2020 for review and provided to ATI in February 2020 for review. |
| 5.8.1 | Groundwater Monitoring: Attainment Analysis | Utilize existing EPA attainment guidance for evaluating contaminant concentrations on a well-by-well basis in the South Extraction Area, Solids Area, and Farm Ponds Area to develop the statistical power required to demonstrate that groundwater cleanup requirements have been met. | ATI will review the applicable guidance and conduct an attainment analysis. ATI will evaluate contaminant concentrations on a well-by-well basis and document wells in remediation monitoring phase, attainment monitoring phase, or attainment achieved. | Approach is included in the 2019 annual report issued by March 31, 2020. ATI requests further discussions with EPA and DEQ for implementation. |
| 5.8.2 | Groundwater Monitoring: Intrinsic Background for Arsenic and Manganese Boundary | Recommends performing a background study to evaluate the range of naturally occurring arsenic and manganese in groundwater. | Due to the various methods to evaluate arsenic and manganese background concentrations, ATI will develop an approach and prepare a background study technical memorandum. | (1) Overall approach of the background study will be discussed during the third quarter 2020 meeting.<br>(2) Background study will be submitted to EPA in November 2020. |
| 5.8.3 | Groundwater Monitoring: Frequent Water Level Measurements at a Few Wells | Recommends frequent water level measurements (twice per month) for approximately five selected wells to provide data to evaluate potential future changes in water quality with respect to water level fluctuations. | ATI understands this option is available and will use it when site activities warrant. DEQ representatives indicated that the water level data may be useful in delineating the groundwater divide to give resolution to the identification of the time each year the divide shifts. | (1) Available historical water level data will be evaluated near the groundwater divide and included in the 2019 annual report to be submitted by March 31, 2020.<br>(2) The need for additional water level data will be discussed during the third quarter 2020 meeting., including the proposition if installing four transducers in the Acid Sump Area. |
| 5.8.4 | Groundwater Monitoring: Consider No-Purge Sampling Methods | Suggests considering no-purge sampling using HydraSleeves or other similar monitoring products. | Based on the volume of sample required for analytes such as radionuclides, no-purge sample methods may not be appropriate and, when used previously, the data were not comparable. | ATI will reevaluate potential use of these methods in 2021 or 2022. |
| 5.8.5 | Groundwater Monitoring: Monitoring Network | ATI provided recommendations for updating the groundwater monitoring schedule to EPA in June 2019. In general, the report supports the revised schedule with a couple of suggested changes. | EPA, DEQ, and ATI agreed at the January 2020 meeting that the monitoring schedule will be evaluated annually as part of annual meetings and adjusted as needed based on current site conditions and active remedies. The 2020 monitoring schedule will be formally submitted by the end of January 2020 and will be implemented as part of the spring 2020 monitoring event. | ATI submitted the 2020 groundwater monitoring schedule on January 31, 2020. |
| 5.8.6 | Groundwater Monitoring: Integrate Sampling Data and Geologic Data into a GIS | Recommends integration of chemical, geological, and hydrological data into a geographical information system (GIS) to facilitate spatial analysis and data interpretation. | ATI will be developing a database to include chemical and groundwater data. Since the historical data are not comprehensive, the database will include data collected over the last 10 years. | ATI will complete the database by the end of 2021. |
| 5.9.1 | Report: Produce Water Level Maps Across Multiple Areas | Recommends that future water level maps consist of two maps—one for the Main Plant and Solids Area and one for the Farm Ponds Area. | ATI will incorporate the recommendation into the 2019 annual report. | To be included in the 2019 annual report to be submitted by March 31, 2020. |

**Table 2. Optimization Recommendation Status**

*ATI Millersburg Operations, Oregon*

| Recommendation | Title | Synopsis | Actions | Schedule |
|---|---|---|---|---|
| 5.9.2 | Report: Produce One Comprehensive Annual Report | Recommends one comprehensive annual groundwater monitoring report be prepared for the entire Site (i.e., Fabrication, Extraction, Solids, and Farm Ponds Areas) and include the groundwater monitoring results, a summary of remedial actions and associated remedy process monitoring, updates regarding ICs, and any other pertinent information regarding remedy progress. It is further recommended that updates regarding other areas (e.g., Soil Amendment Area, East Perimeter Area) also be included in the comprehensive annual report. | One report will be prepared for the Main Plant and Solids Area and a separate report will be prepared for the Farm Ponds Area. | Incorporated into the 2019 annual report(s) to be submitted by March 31, 2020. |
| 5.9.3 | Report: Include Statistical Trend in Annual Report | Recommends statistical trend analysis (such as the Mann-Kendall test) be conducted at selected wells; includes criteria for target wells and chemicals. | ATI will incorporate the recommendation into the 2019 annual report. | ATI is incorporating statistical trends with the attainment analysis (Recommendation 5.8.1) for a complete trend analysis. ATI included the approach in the 2019 annual report and requests further discussions with EPA and DEQ for implementation of COC trend analysis. |
| 5.9.4 | Report: Evaluate Triggers for Additional Discussion or Action | Recommends development of a decision logic to identify threshold criteria for taking actions or transitioning remedial technologies. Recommends possibly including triggers for additional discussion, additional characterization or investigation, supplemental remedial actions, or ceasing active remediation. | EPA, DEQ, and ATI agreed at the January 2020 meeting to discuss as part of the third quarter 2020 meeting. | Discussion will occur during the third quarter 2020 meeting, tentatively scheduled for August. Criteria, if developed, will be finalized prior to issuance of the March 2021 annual report. |

Notes

ASA = Acid Sump Area
AWQC = ambient water quality criteria
COC = constituent of concern
ESD = explanation of significant differences
FMA = Feed Makeup Area
GETS = groundwater extraction and treatment system
GIS = geographical information system
IC = institutional control
MNA = monitored natural attenuation
P&T = pump and treat
SWMU = soil waste management unit

**Table 3. GETS Monthly Average of Groundwater Extraction Volumes**

*ATI Millersburg Operations, Oregon*

| Extraction Well | Monthly Average Volume of Groundwater Extracted (gallons) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| FW-1 | 151,700 | 162,900 | 166,000 | 171,000 | 207,900 | 393,800 | 422,484 | 357,322 | 301,511 | 289,316 | 202,304 | 232,099 | 306,696 | 198,260 | 285,497 | 149,133 | 446,185 | 423,207 |
| FW-2 | 281,800 | 234,800 | 160,000 | 219,800 | 231,500 | 685,800 | 682,640 | 749,026 | 675,762 | 909,635 | 619,699 | 378,371 | 597,127 | 421,505 | 408,869 | 167,358 | 221,087 | 42,658 |
| FW-3 | 65,500 | 90,900 | 88,900 | 85,100 | 93,400 | 100,500 | 100,532 | 96,235 | -- | 60,804 | 100,868 | 117,719 | 99,340 | 102,326 | 159,783 | 154,528 | 97,511 | 89,809 |
| FW-4 | 125,900 | 144,000 | 113,500 | 168,700 | 172,200 | 183,900 | 183,930 | 148,071 | 110,757 | 226,808 | 192,976 | 184,057 | 154,537 | 174,856 | 179,885 | 145,678 | 69,915 | 101,754 |
| FW-5 | 94,900 | 63,200 | 47,100 | 35,100 | 39,800 | 52,900 | 156,772 | 217,659 | 256,701 | 718,223 | 95,637 | 130,918 | 160,928 | 82,015 | 93,387 | 258,035 | 454,878 | 1,006,471 |
| FW-7 | 91,900 | 109,130 | 85,900 | 107,700 | 153,000 | 147,900 | 177,355 | 177,622 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| EW-1 | 62,585 | 96,470 | 40,845 | 52,698 | 38,330 | 58,508 | 73,969 | 82,988 | 77,660 | 92,754 | 9,504 | 8,551 | 3,681 | 3,841 | 3,072 | 4,381 | 1,702 | 1,243 |
| EW-2 | 43,427 | 148,201 | 183,317 | 218,402 | 220,624 | 152,305 | 151,512 | 257,522 | 239,106 | 217,849 | 18,099 | 8,186 | 7,270 | 10,545 | 6,732 | 2,102 | 7,543 | 40,229 |
| EW-3 | 103,247 | 97,108 | 85,156 | 112,590 | 145,051 | 147,420 | 136,499 | 156,515 | 74,263 | 44,471 | 7,640 | 6,870 | 3,857 | 3,575 | 2,630 | 5,893 | 7,541 | 3,323 |
| EW-4 | 1,312,229 | 1,634,247 | 1,024,910 | 1,232,475 | 2,099,331 | 1,461,224 | 1,247,634 | 397,524 | 1,794,533 | 50,055 | -- | -- | -- | -- | -- | -- | -- | -- |
| EW-5 | 43,272 | 64,506 | 83,517 | 107,667 | 552,351 | 430,920 | 271,403 | 69,607 | 203,440 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| EW-6 | 62,290 | 88,846 | 67,763 | 62,343 | 73,845 | 81,665 | 37,950 | 0 | 0 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| GETS Monthly Average | 2,438,750 | 2,934,308 | 2,146,908 | 2,573,575 | 4,027,332 | 3,896,842 | 3,642,679 | 2,710,091 | 3,733,734 | 2,609,916 | 1,246,725 | 1,066,771 | 1,333,436 | 996,924 | 1,139,855 | 887,107 | 1,306,363 | 1,708,694 |
| Annual Rainfall (inches) | 43.5 | 46.9 | 35.4 | 39.3 | 53.4 | 37.6 | 31.62 | 34.09 | 50.52 | 32.48 | 59.17 | 25.15 | 46.24 | 40.98 | 51.43 | 50.4 | 33.67 | 29.05 |

Notes

FW-3 shut down in 2010 for the Acid Sump Remediation Project.

FW-7 shut down on July 30, 2009, per U.S. Environmental Protection Agency approval.

EW-4 through EW-6 shut down on April 15, 2011, per U.S. Environmental Protection Agency approval.

Beginning in 2017, only one or two of the extraction wells in the Feed Makeup Area (EW-1, EW-2, and EW-3) were operating at a time during GETS optimization tests.

FW = Fabrication Area extraction well

EW = Extraction Area extraction well

GETS = groundwater extraction and treatment system

**Table 4. GETS Mass Recovery for Constituents of Concern in 2019**

*ATI Millersburg Operations, Oregon*

| Ammonium (lbs) | | Fluoride (lbs) | Nickel (lbs) | TDS (lbs) | Radium-226 (lbs) | Radium-228 (lbs) | Total VOCs (lbs) |
|---|---|---|---|---|---|---|---|
| EW-2 | FW-5 | EW-2 | EW-2 | EW-2 | EW-2 | EW-2 | FW-1, FW-2, FW-3, FW-4 |
| 1.32 | 117 | 0 | 0.016 | NS | 0.00000000000030 | 0.00000000000000430 | 34 |

Notes

EW-1 and EW-3 were not operational in 2019 for a GETS optimization test.

FW = Fabrication Area extraction well

EW = Extraction Area extraction well

lbs = pounds

GETS = groundwater extraction and treatment system

TDS = total dissolved solids

VOCs = volatile organic compounds

**Table 5a. TCA Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | | | | |
| EW-4 | µg/L | 200 | | 1.02 | 0.5 U | 0.5 U | 0.5 U | 1.44 | 0.41 J | 0.5 U | | | | | 0.50 U | 0.50 U | | | | | | |
| EW-5 | µg/L | 200 | | 0.32 J | 0.5 U | 0.5 U | 0.5 U | 1.88 | 0.5 U | 7.28 | | | | | 0.34 J | 0.23 J | | | | | | |
| EW-6 | µg/L | 200 | | 0.29 J | 0.5 U | 0.5 U | 0.5 U | 0.59 | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | | | | | | |
| PW-25A | µg/L | 200 | 4.1 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.34 J | 0.5 U | 0.5 U | | | | | 0.18 J | | | | | | | |
| PW-26A | µg/L | 200 | 2.1 | 0.31 J | 0.5 U | 0.5 U | 0.5 U | 0.95 | 0.5 U | 0.89 | 0.2 U | 0.16 J | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 2.65 | | | | |
| PW-29A | µg/L | 200 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.28 J | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | | 0.50 U | 0.50 U | | | | |
| PW-47A | µg/L | 200 | 68 | 0.08 J | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.63 | 0.34 J | 0.27 J | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | | | | |
| PW-48A | µg/L | 200 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.26 J | | 0.5 U | | | 0.50 U | | | | | | | |
| PW-49A | µg/L | 200 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-57A | µg/L | 200 | 42.1 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | | 0.5 U | 0.5 U | 0.50 U | 0.5 U | | 0.50 U | | | | |
| PW-96A | µg/L | 200 | | 2.23 J | 0.5 U | 0.5 U | 0.5 U | 3.27 | 0.5 U | 0.5 U | 22.1 | 47.6 | 3.15 | 0.66 | 0.90 | 4.89 | 1.85 | 0.50 U | | | 10.2 | 9.39 |
| PW-97A | µg/L | 200 | | 2.54 | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.5 U | 0.36 J | 0.50 U | | | | |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | | | |
| E-11 | µg/L | 200 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.24 J | 0.5 U | 0.5 U | 0.29 J | 1.6 | 6.28 | 1 | 0.5 | 0.74 | 0.52 | 3.04 | 9.39 | 7.71 | 8.08 | 8.88 |
| EI-5 | µg/L | 200 | | | | | | | | | | | | | | 15.3 [3] | 4,040 | 40.2 | 766 | 90.2 J | 144 | 10.0 U |
| FW-1 | µg/L | 200 | 1 U | 2,103 | 1,922 | 1,403 | 1,089 | 858 | 494 | 113.2 | 88.2 | 59.2 | 40.2 | 77.1 | 298 | 174 | 67.1 | 71.7 | | 445 | | 5.45 |
| FW-2 | µg/L | 200 | 15 | 1.85 | 1.63 | 0.43 J | 0.53 | 0.5 U | 0.51 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.66 | 0.88 | 0.68 | 0.33 J | 0.43 J | 0.4 U | 0.936 | | 0.22 J |
| FW-3 | µg/L | 200 | 9,900 D | 555 | 528 | 13.6 | 10.2 | 7.25 | 6.49 | 7.93 | 6.39 | 18.3 | 13.2 | 236 | 181 | 161 | 5.58 | 5.01 | 4.92 | 4.51 | 186 | 0.893 |
| FW-4 | µg/L | 200 | | 311 | 309 | 183.5 | 166.6 | 124.3 | 94.8 | 74.3 | 68.2 | 55.9 | 44.4 | 254 | 304 | 88.2 | 373 | 475 | 387 | 537 | 186 | 172 |
| FW-5 | µg/L | 200 | | | | | | | | | | | | | 0.5 U | | | | | | | 0.400 |
| FW-6 | µg/L | 200 | | 8.17 | 3.18 | 6.25 | 1.11 | 0.2 U | 0.98 | 0.49 J | 0.5 U | 1.61 | 2.15 | 39 | 0.74 | 2.01 | 0.500 U | 1.49 | 0.995 | 0.400 U | 0.400 U | 1.18 U |
| FW-7 | µg/L | 200 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.500 U | 0.500 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| I-2 | µg/L | 200 | | | | | | | | | | | | | | 30,000 [3] | 18,400 | 28,300 | 25,100 | 38,400 | 31,400 | 22,900 |
| I-3 | µg/L | 200 | | | | | | | | | | | | | | 1.46 [3] | 1,750 | 1.44 | 1,800 | 5.44 | 62.4 | 0.332 |
| MW-01A | µg/L | 200 | 2.4 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| MW-02A | µg/L | 200 | 37 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| MW-03A | µg/L | 200 | 3.7 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 1.65 | 0.275 J | 0.400 U | 0.400 U | 0.400 U |
| MW-04A | µg/L | 200 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-01A | µg/L | 200 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 31.8 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-03A | µg/L | 200 | 26.6 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-10 | µg/L | 200 | 125 | 1.23 | 0.13 J | 0.68 | 0.5 U | 0.55 | 0.5 U | 0.5 U | 41.9 | 51.4 | 25.6 | 39.1 | 25.6 | 15.3 | 23.8 | 33.2 | 24.1 | 15.5 | 22.5 | 23.1 |
| PW-11 | µg/L | 200 | 135 | 15.2 | 4.61 | 3.1 | 1.65 | 13.9 | 11.5 | 10.2 | 254 | 176 | 43.5 | 85.4 | 131 | 11.3 | 11.00 | 66.1 | 9.78 | 8.03 | 3.00 | 1.71 |
| PW-12 | µg/L | 200 | 8,100 | 823 | 389 | 364 | 65 | 1,710 E | 308 | 251 | 1,160 | 1,170 | 894 | 1,360 | 527 | 616 | 166 | 155 | 640 | 504 | 6.8 | 149 |
| PW-13 | µg/L | 200 | 564 | 152 | 15.6 | 56 | 8.77 | 10.4 | 9.98 | 9.77 | 154 | 197 | 113 | 139 | 13.5 | 38.2 | 24.2 | 41.7 | 92.4 | 68.5 | 2,080 | 3,960 |
| PW-14 | µg/L | 200 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-15AR | µg/L | 200 | 39 | | | | | | | | | | | | 0.38 J | | | | | | | |
| PW-16A | µg/L | 200 | 2.6 | 3.78 | 1.89 | 1.2 | 0.53 | 0.74 | 0.5 U | 0.5 U | 0.5 U | 2.89 | 2.92 | 0.31 J | 0.40 J | 0.91 | 0.27 J | 0.18 J | 0.400 U | | 0.400 U | 0.257 U |
| PW-19A | µg/L | 200 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.77 | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-20A | µg/L | 200 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-30A | µg/L | 200 | 1,680 | 431 | 415 | 286 | 264 | 213 E | 212 E | 390 | 211 | 280 | 200 | 372 | 551 | 184 | 500 | 827 | 509 | 741 | 321 | 370 |
| PW-31A | µg/L | 200 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-42A | µg/L | 200 | 3.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-45A | µg/L | 200 | 6.3 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.450 | 0.400 |

**Table 5a. TCA Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-46A | µg/L | 200 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.46 J | 0.5 U | 0.35 J | 0.5 U | 0.2 J | 0.52 | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-68A | µg/L | 200 | **652** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 1.16 | 0.400 U | 0.400 U |
| PW-69A | µg/L | 200 | **3,790** | **368** | 28.8 | **245** | 13.4 | 43.4 | 127 E | 111 | 145 | 9.5 | 103 | 95.4 | 60.5 | 55.4 | 96.2 | 117 | **281** | 102 | 86.0 | 2.44 |
| PW-70AR | µg/L | 200 | 1 U | | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-71A | µg/L | 200 | 18.3 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-72A | µg/L | 200 | 2.4 | | | | | | | | | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-73B | µg/L | 200 | 1.9 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.25 U |
| PW-74B | µg/L | 200 | 1.1 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-75A | µg/L | 200 | **311** | 39.6 | 27.5 | 21.3 | 11.6 | 13.1 | 15.9 | 8.24 | 12.5 | 7.26 | 20.8 | 10.2 | 21.7 | 28.6 | 62.6 | 18 | 65.3 | 28.9 | 56.0 | 22.9 |
| PW-76A | µg/L | 200 | 14.8 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2.1 | 2.02 | 0.16 J | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-77A | µg/L | 200 | 50 U | 2.15 | 1.08 | 1.26 | 0.53 | 0.33 J | 0.49 J | 0.35 J | 0.55 | 5.25 | 2.05 | 0.32 J | 0.25 J | 0.19 J | 1.6 | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-78A | µg/L | 200 | 22.8 | 9.55 | 2.18 | 4.38 | 0.67 | 0.5 U | 0.5 U | 0.5 U | 7.37 | 17.2 | 12.5 | 8.55 | 8.0 | 6.19 | 10.2 | 9.69 | 16.7 | 10.4 | 19.6 | 19.8 |
| PW-79A | µg/L | 200 | 28.9 | 4.19 | 1.33 | 4.34 | 0.69 | 2.81 | 0.44 J | 0.32 J | 2.3 | 3.07 | 2.52 | 0.21 J | 0.35 J | 0.5 U | 13.9 | 3.73 | 16.6 | 19.1 | 11.3 | 10.8 |
| PW-80A | µg/L | 200 | 108 | 2.09 | 0.49 J | 1.25 | 0.5 U | 0.32 J | 0.5 U | 0.5 U | 0.78 | 5.04 | 3.66 | 3.1 | 10.2 | 18 | 5.34 | 6.16 | 13.8 | 4.3 | 24.5 | 9.13 |
| PW-81A | µg/L | 200 | 1 U | | | | | | | | | | | | 0.28 J | | | | | | | 0.4 |
| PW-82A | µg/L | 200 | 9.4 | 1.22 | 0.77 | 0.59 | 0.23 J | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 1.75 | 1.23 | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-83A | µg/L | 200 | 10.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-84AR | µg/L | 200 | 18.2 | 5.25 | 2.33 | 2.81 | 1.42 | 1.48 | 2.37 | 1.95 | 1.26 | 0.48 J | 0.48 J | 0.44 J | 0.38 J | 0.33 J | 0.27 J | 0.51 | 0.92 | 1.09 | 0.718 | 0.650 |
| PW-85A | µg/L | 200 | 37.3 | 8.95 | 6.18 | 6.34 | 2.34 | 4.56 | 3.07 | 2.91 | 2.34 | 1.71 | 0.68 | 0.61 | 0.33 J | 0.28 J | 0.4 J | | 1.2 | 1.19 | 1.04 | 0.870 |
| PW-86A | µg/L | 200 | 2.6 | 0.98 | 0.33 J | 0.54 | 0.5 U | 0.21 J | 0.5 U | 0.5 U | 0.75 | 0.57 | 0.5 U | 0.26 J | 0.50 J | 0.50 U | 0.50 U | | 0.800 U | 0.400 U | 1.00 U | 0.400 U |
| PW-87A | µg/L | 200 | 1.018 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-88A | µg/L | 200 | 2.6 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.15 J | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-89A | µg/L | 200 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.15 J | 0.17 J | 0.400 U | 0.400 U | 0.212 J | 0.321 J |
| PW-91A | µg/L | 200 | **391** | 1.79 | 1.31 | 0.54 | 0.64 | 16.4 0 | 0.39 J | 10 | 6.8 | 3.38 | 3.59 | 8.73 | 6.49 | 0.55 | 8.45 | 11.4 | 15.2 | 5.63 | 5.62 | 1.14 |
| PW-92A | µg/L | 200 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-93A | µg/L | 200 | | **11,100** | **1,120** | **5,970** | **845** | **350** | 19.6 | 16.7 | 11.5 | 10.1 | 28.2 | 28.7 | 18.8 | 26.6 | 46.6 | 29.1 | 76.7 | 29.3 | 22.8 | 6.90 |
| PW-94A | µg/L | 200 | | 39 | 197 | 12 | 156 | 129 E | 153 E | 146 | **260** | **1,380** | **1,610** | **1,830** | **2,460** | **2,260** | **1,430** | **1,190** | **1,630** | **525** | **748** | **233** |
| PW-95A | µg/L | 200 | | **348** | 90.4 | **234** | 45.2 | | 175 E | 156 | 132 | 65.2 | **582** | **259** | **373** | 149 | **699** | 153 | 26 | **363** | **805** | **568** |
| PW-98A | µg/L | 200 | | **507** | 183 | 123 | 128 | 6.53 | 37.8 | 24.2 | 1.12 | 26.5 | 73.2 | **407** | **1,000** | **548** | **1,270** | **1,340** | **894** | **2,600** | **466** | **474** |
| PW-99A | µg/L | 200 | | 22.1 | 7.15 | 8.94 | 5.18 | 24 | 19.3 | 11.2 | 43.5 | 131 | 43 | 26.7 | 38.3 | 157 | 86.9 | 74.9 | 70.6 | 54.7 | 41.5 | 13.2 |
| PW-100A | µg/L | 200 | | 0.99 | 113 | 102 | 84.5 | 35.3 | 0.95 | 0.81 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | **1,060** | **1,080** | **436** | 0.823 | 149 | 4.1 |
| PW-101A | µg/L | 200 | | 0.08 J | 8.93 | 6.78 | 5.67 | 0.3 J | 0.5 U | 0.5 U | 1.25 | 0.5 | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.408 | 0.400 U | 3.35 |

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

[3] Initial samples were collected in fall 2016 for EI-5, I-2, and I-3.

10-year rolling table. Refer to past annual reports for a full records of historical concentrations.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

µg/L = micrograms per liter

D = diluted

E = estimated value above the calibration range

J = estimated value

TCA = 1,1,1-trichloroethane

U = not detected above reporting limit

**Table 5b. DCA Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level[1] | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[2] | Spring 2015 | Spring 2016[3] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | | | | |
| EW-4 | µg/L | 1,280 | | 1.13 | 0.5 U | 0.5 U | 0.5 U | 3.45 | 0.49 J | 0.5 U | | | | | 0.50 U | 0.50 U | | | | | | |
| EW-5 | µg/L | 1,280 | | 11.4 | 0.5 U | 0.5 U | 0.5 U | 3.52 | 1.67 | 10.4 | | | | | 0.5 | 0.3 J | | | | | | |
| EW-6 | µg/L | 1,280 | | 0.78 | 0.5 U | 0.5 U | 0.5 U | 1.5 | 1.1 | 0.51 | | | | | 0.35 J | 0.47 J | | | | | | |
| PW-25A | µg/L | 1,280 | 6.5 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.72 | 1.13 | 4.12 | | | | | 1.22 | | | | | | | |
| PW-26A | µg/L | 1,280 | 1.4 | 0.35 J | 0.5 U | 0.5 U | 0.5 U | 0.59 | 0.5 U | 0.2 J | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.15 J | 10.4 | | | | |
| PW-29A | µg/L | 1,280 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.25 J | 0.5 U | 0.61 | 0.2 U | 0.51 | 0.5 U | 0.5 U | 0.50 U | | 0.50 U | 0.50 U | | | | |
| PW-47A | µg/L | 1,280 | 41.2 | 1.33 | 0.5 U | 0.5 U | 0.5 U | 2.36 | 0.5 U | 2.56 | 2.63 | 1.91 | 1.33 | 0.97 | 1.22 | 1.38 | 1.50 | 1.62 | | | | |
| PW-48A | µg/L | 1,280 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-49A | µg/L | 1,280 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-57A | µg/L | 1,280 | 22.8 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.94 | 0.5 U | 1.29 | 1.28 | 0.62 | 1.02 | 0.48 J | 0.58 | 0.73 | | 1.02 | | | | |
| PW-96A | µg/L | 1,280 | | 40.3 | 10.2 | 0.5 U | 0.5 U | 26 | 0.5 U | 18.7 | 35.6 | 52.5 | 10.6 | 2.97 | 5.31 | 9.85 | 15.2 | 0.24 J | | | 22.7 | 28.0 |
| PW-97A | µg/L | 1,280 | | 20.9 | 2.35 | 0.5 U | 0.5 U | 3.74 | 0.5 U | 3.51 | 4.33 | 4.34 | 3.56 | 0.83 | 0.62 | 0.63 | 2.49 | 0.43 J | | | | |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | | | |
| E-11 | µg/L | 3,700 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.43 J | 0.46 J | 0.5 U | 0.25 J | 0.55 | 0.53 | 1.43 | 0.81 | 0.19 J | 0.41 J | 0.96 | 2.86 | 2.47 | 2.02 | 2.34 |
| EI-5 | µg/L | 3,700 | | | | | | | | | | | | | | 108 [4] | 2950 | 731 | 572 | 169 | 148 | 22.8 |
| FW-1 | µg/L | 3,700 | 1 | 382 | 366 | | | 101.1 | 111 | 55.1 | 48.3 | 43.2 | 38.4 | 133 | 440 | 6.12 | 154 | 173 | | 119 | | 9.80 |
| FW-2 | µg/L | 3,700 | 35.7 | 3.79 | 2.88 | | | 0.54 | 0.64 | 3.11 | 2.12 | 2.11 | 1.64 | 0.68 | 0.15 J | 0.27 J | 0.50 U | 0.50 U | 0.400 U | 0.614 | | 0.33 J |
| FW-3 | µg/L | 3,700 | 912 | 83.1 | 77.4 | | | 7.22 | 3.61 | 1.41 | 1.14 | 8.15 | 5.68 | 118 | 123 | 3.19 | 6.11 | 3.52 | 5.13 | 5.45 | 63.5 | 1.48 |
| FW-4 | µg/L | 3,700 | | 15.8 | 16.2 | | | 2.54 | 0.72 | 6.55 | 5.92 | 2.85 | 2.03 | 7.33 | 8.85 | 0.5 U | 7.08 | 7.63 | 7.59 | 12.7 | 5.81 | 5.81 |
| FW-5 | µg/L | 3,700 | | | | | | | | | | | | | 0.66 | | | | | | | 5.42 |
| FW-6 | µg/L | 3,700 | | 4.82 | 6.13 | 3.1 | 4.18 | 0.73 | 3.78 | 2.55 | 0.31 J | 0.35 J | 0.21 J | 76.4 | 0.37 J | 0.47 J | 0.96 | 0.98 | 0.685 | 1.12 | 0.951 | 1.9 |
| FW-7 | µg/L | 3,700 | | 0.49 J | 0.33 J | | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.49 | 0.16 J | 2.11 | 0.50 U | 1.92 | 3.92 | 2.54 | 1.60 |
| I-2 | µg/L | 3,700 | | | | | | | | | | | | | | **6,460** [4] | **6,550** | **11,800** | **13,200** | **17,600** | **12,200** | **17,600** |
| I-3 | µg/L | 3,700 | | | | | | | | | | | | | | 0.95 [4] | 341 | 4.35 | 103 | 12.5 | 12.1 | 1.15 |
| MW-01A | µg/L | 3,700 | 58.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5.14 | 6.97 | 6.59 | 17.6 | 14 | 13.5 | 15.2 | 8.20 | 10.40 | 12.6 | 12.0 | 10.3 | 19.4 | 12.0 | 10.1 |
| MW-02A | µg/L | 3,700 | 154 | 0.55 | 4.89 | 3.81 | 1.25 | 4.43 | 2.11 | 2.02 | 1.81 | 1.87 | 0.5 U | 1.53 | 1.32 | 1.03 | 1.21 | 1.46 | 1.46 | 6.86 | 7.53 | 8.74 |
| MW-03A | µg/L | 3,700 | 2.806 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.54 | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 1.2 | 0.355 J | 0.276 J | 0.400 U | 0.979 |
| MW-04A | µg/L | 3,700 | 75 | 0.5 U | 4.68 | 2.84 | 2.11 | 2.07 | 3.36 | 3.18 | 1.96 | 2.16 | 1.6 | 1.81 | 0.65 J | 0.69 | 0.79 | 0.76 | 0.400 U | 0.673 | 0.450 | 0.703 |
| PW-01A | µg/L | 3,700 | 24.3 | 0.5 U | 0.98 | 0.88 | 0.55 | 0.72 | 14 | 12.7 | 12.7 | 9.17 | 10.1 | 9.14 | 7.61 | 7.38 | 0.75 | 0.50 U | 5.440 | 7.290 | 0.260 J | 0.800 |
| PW-03A | µg/L | 3,700 | 49.9 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.38 J | 0.3 J | 0.29 J | 0.26 J | 0.18 J | 0.17 J | 0.50 U | 0.50 U | 0.21 J | 0.28 J | 0.580 | 0.798 | 1.160 | 1.910 |
| PW-10 | µg/L | 3,700 | 327 | 0.5 U | 35.1 | 23.9 | 22.2 | 18.1 | 15.6 | 14.9 | 67.5 | 81.3 | 60.9 | 77.5 | 26.7 | 24.9 | 37.3 | 50.7 | 27.7 | 31.5 | 34.3 | 34.5 |
| PW-11 | µg/L | 3,700 | 54.3 | 0.5 U | 8.15 | 2.68 | 3.12 | 31.6 | 29.6 | 24.8 | 80.8 | 52.9 | 16.3 | 31.8 | 86.3 | 5.57 | 10.30 | 26.1 | 4.09 | 7.87 | 2.35 | 1.67 |
| PW-12 | µg/L | 3,700 | 901 | 2.5 U | 312 | 189 | 289 | 296 | 774 E | 725 | 299 | 335 | 236 | 426 | 199 | 173 | 36.8 | 26.9 | 124 | 99.7 | 6.07 | 30.6 |
| PW-13 | µg/L | 3,700 | 1,660 | 0.77 J | 1524 | 789 | 1125 | 117 E | 112 | 105 | 1280 | 2400 | 1970 | 3030 | 308 | 1010 | 568 | 715 | 2,670 | 1,710 | 2,300 | 3,190 |
| PW-14 | µg/L | 3,700 | 2.2 | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-15AR | µg/L | 3,700 | 5 U | | | | | | | | | | | | 0.76 | | | | | | | |
| PW-16A | µg/L | 3,700 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.6 | 0.28 J | 0.24 J | 0.34 J | 0.36 J | 0.87 | 0.42 J | 0.37 J | 0.217 J | | 0.500 U | 0.395 J |
| PW-19A | µg/L | 3,700 | 1.7 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.500 U | 0.400 U |
| PW-20A | µg/L | 3,700 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-30A | µg/L | 3,700 | 34 | 1.1 U | 5.6 | 4.5 | 3.9 | 4.54 | 4.25 | 7.54 | 4.57 | 5.51 | 4.23 J | 7.05 | 10.6 | 3.51 | 7.08 | 10.3 | 6.23 | 11.2 | 5.42 | 8.06 |
| PW-31A | µg/L | 3,700 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-42A | µg/L | 3,700 | 21.8 | 0.5 U | 3.37 | 2.01 | 0.84 | 1.89 | 3.07 | 2.09 | 2.2 J | 1.91 | 1.61 | 1.26 | 1.40 | 1.17 | 1.04 | 1.42 | 28.1 | 46.8 | 63.4 | 48.4 |
| PW-45A | µg/L | 3,700 | 128 D | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.21 J | 0.62 | 0.5 U | 0.35 J | 1.29 | 0.50 U | 0.50 U | 1.80 | 0.856 | 4.060 | 1.190 | 2.820 |

**Table 5b. DCA Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level[1] | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[2] | Spring 2015 | Spring 2016[3] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-46A | µg/L | 3,700 | 9.5 | 0.5 U | 2.86 | 2.64 | 1.34 | 5.27 | 1.16 | 4.81 | 0.68 | 1.66 | 0.55 | 0.36 J | 0.50 U | 0.68 | 0.93 | 0.50 U | 0.396 J | 0.400 U | 1.270 | 0.464 |
| PW-68A | µg/L | 3,700 | 53.1 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.461 | 0.400 U | 0.400 U |
| PW-69A | µg/L | 3,700 | 648 | 5 U | 141 | 189 | 135 | 56.8 | 100 | 97.3 | 149 | 11.3 | 38.3 | 38 | 31.5 | 38.3 | 84.7 | 112 | 143 | 28.5 | 47.6 | 45.1 |
| PW-70AR | µg/L | 3,700 | 1 U | | 0.16 J | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-71A | µg/L | 3,700 | 51.4 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.56 | 1.32 | 0.56 | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.27 J | 0.25 J | 3.250 | 0.400 U | 8.150 | 0.740 |
| PW-72A | µg/L | 3,700 | 3.1 | | | | | | | | | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-73B | µg/L | 3,700 | 41.6 | 0.5 U | 3.54 | 1.18 | 1.65 | 2.85 | 1.11 | 1.17 | 1.43 | 1.23 | 1.25 | 0.5 U | 1.40 | 1.15 | 1.97 | 0.93 | 1.730 | 0.890 | 0.773 | 1.29 |
| PW-74B | µg/L | 3,700 | 3.2 | 0.5 U | 0.83 | 1.15 | 0.49 J | 3.47 | 0.5 U | 2.84 | 1.31 | 0.88 | 2.18 | 1.18 | 1.14 | 0.64 | 1.16 | 0.65 | 0.812 | 0.640 | 0.762 | 0.590 |
| PW-75A | µg/L | 3,700 | 54.6 | 0.5 U | 9.68 | 2.33 | 6.47 | 3.21 | 1.85 | 1.24 | 1.87 | 1.17 | 2.98 | 2.53 | 3.48 | 2.17 | 5.13 | 2.22 | 8.06 | 5.70 | 4.95 | 3.46 |
| PW-76A | µg/L | 3,700 | 2.3 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.4 J | 0.33 J | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-77A | µg/L | 3,700 | 189 | 0.5 U | 186 | 143 | 142 | 156 | 134 | 126 | 83 | 83.8 | 46.4 | 70.2 | 55.5 | 20.3 | 36.9 | 36.50 | 37.8 | 40.4 | 8.880 | 11.9 |
| PW-78A | µg/L | 3,700 | 118 | 0.5 U | 87.2 | 73.4 | 25.8 | 22.9 | 18.1 | 17.2 | 62.2 | 62 | 59.3 | 65.1 | 51.2 | 58 | 58.8 | 59.7 | 58.9 | 51 | 50.7 | 30.4 |
| PW-79A | µg/L | 3,700 | 12.3 | 0.5 U | 1.64 | 1.26 | 1.16 | 0.55 | 0.67 | 0.61 | 2.56 | 1.52 | 0.5 U | 0.59 | 1.23 | 0.5 U | 14.4 | 6.77 | 13.3 | 21.3 | 11.6 | 11.7 |
| PW-80A | µg/L | 3,700 | 15.6 | 0.5 U | 0.23 J | 0.54 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.09 | 3.84 | 2.39 | 2.95 | 14.7 | 21.9 | 9.58 | 11.8 | 20.3 | 10.8 | 30.5 | 13.1 |
| PW-81A | µg/L | 3,700 | 1 U | | | | | | | | | | | | 4.43 | | | | | | | 0.420 |
| PW-82A | µg/L | 3,700 | 1.8 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.500 U | 0.400 U |
| PW-83A | µg/L | 3,700 | 11.4 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.89 | 0.51 | 0.51 | 0.87 | 0.5 | 0.24 J | 0.30 J | 0.38 J | 0.48 J | 0.47 J | 0.870 | 0.580 | 0.577 | 0.510 |
| PW-84AR | µg/L | 3,700 | 6.5 | 0.5 U | 2.49 | 2.18 | 1.98 | 1.46 | 3.12 | 2.9 | 2.12 | 2.02 | 2.2 | 2.25 | 1.76 | 1.15 | 1.41 | 1.47 | 4.34 | 13 | 12.1 | 11.1 |
| PW-85A | µg/L | 3,700 | 17.4 | 0.5 U | 8.26 | 4.18 | 5.54 | 3.15 | 3.86 | 4.28 | 3.5 | 3.59 | 2.27 | 2.34 | 1.66 | 1.31 | 1.95 | | 3.96 | 10.4 | 6.72 | 8.180 |
| PW-86A | µg/L | 3,700 | 243 | 0.5 U | 0.5 U | 0.11 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.42 J | 0.17 J | 0.89 | 0.5 U | 0.50 U | 0.28 J | 0.50 U | | 0.764 J | 1.160 | 2.19 | 2.010 |
| PW-87A | µg/L | 3,700 | 1.5 | 0.5 U | 0.23 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.31 J | 0.5 U | 0.17 J | 0.16 J | 0.5 U | 0.15 J | 0.26 J | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-88A | µg/L | 3,700 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.2 J | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-89A | µg/L | 3,700 | 5.7 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.31 J | 0.33 J | 0.62 | 0.5 | 0.27 J | 0.50 U | 0.62 | 1.19 | 1.25 | 1.810 | 3.070 | 6.05 | 7.30 |
| PW-91A | µg/L | 3,700 | 63.2 | 0.5 U | 1.52 | 0.89 | 0.84 | 3.05 | 0.69 | 2.84 | 3.8 | 2.44 | 2.44 | 4.73 | 5.86 | 1.8 | 3.4 | 4.73 | 5.67 | 3.57 | 2.74 | 0.816 |
| PW-92A | µg/L | 3,700 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-93A | µg/L | 3,700 | | 25 | **9,770** | 3,380 | **6,218** | 3150 E | 185 | 166 | 171 | 83.4 | 58 | 83.1 | 59.2 | 49.7 | 105 | 94 | 81.3 | 112 | 59.6 | 928 |
| PW-94A | µg/L | 3,700 | | 0.5 U | 125 | 8.96 | 81 | 43.3 | 60.1 | 58.2 | 75.4 | 118 | 121 | 166 | 187 | 130 | 599 | 522 | 358 | 469 | 220 | 231 |
| PW-95A | µg/L | 3,700 | | 0.5 U | 60.6 | 3.16 | 45.1 | | 43.9 | 41.6 | 50.2 | 40.3 | 79.8 | 45.8 | 63.7 | 36.4 | 799 | 275 | 66.1 | 155 | 564 | 1,830 |
| PW-98A | µg/L | 3,700 | | 3.42 | 503 | 268 | 384 | 7.63 | 39.4 | 37.1 | 12 | 18.8 | 52.2 | 111 | 311 | 308 | 621 | 552 | 515 | 1,170 | 326 | 399 |
| PW-99A | µg/L | 3,700 | | 0.5 U | 23.9 | 41.5 | 14.8 | 56.6 | 52.3 | 49.1 | 37.3 | 54.8 | 46.9 | 15.9 | 32.5 | 120 E | 34.9 | 58.2 | 68.2 | 76.2 | 37.4 | 17.2 |
| PW-100A | µg/L | 3,700 | | 5.5 | 2250 | 2100 | 1850 | 222 | 10.7 | 10.2 | 2.78 | 3.18 | 2.54 | 2.2 | 0.99 | 1.06 | 1,680 | 2,040 | 1,970 | 56.7 | 333 | 62.6 |
| PW-101A | µg/L | 3,700 | | 1.56 | 671 | 591 | 513 | 2.99 | 0.95 | 0.87 | 0.75 | 0.42 J | 0.51 | 1.85 | 0.51 | 0.67 | 2.85 | 2.89 J | 13.7 | 6.03 | 19.4 | 30.8 |

Notes

[1] The cleanup level differs for each area. See the Quality Assurance Project Plan for Sitewide Remedial Action (GSI, 2015) for more details.

[2] The fall 2014 monitoring event was conducted in February 2015.

[3] The spring 2016 event was a sitewide groundwater and surface water sampling event.

[4] Initial samples were collected in fall 2016 for EI-5, I-2, and I-3.

10-year rolling table. Refer to past annual reports for a full records of hist U = not detected above reporting limit

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

µg/L = micrograms per liter — E = estimated value above the calibration range

D = diluted — J = estimated value

DCA = 1,1-dichloroethane — U = not detected above reporting limit

**Table 5c. PCE Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | | | | |
| EW-4 | µg/L | 5 | | 0.29 J | 0.5 U | 0.5 U | 0.5 U | 0.33 J | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | | | | | | |
| EW-5 | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.28 J | 0.5 U | 0.48 J | | | | | 0.22 J | 0.15 J | | | | | | |
| EW-6 | µg/L | 5 | | 0.12 J | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.1 J | | | | | 0.50 U | 0.50 U | | | | | | |
| PW-25A | µg/L | 5 | 3 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.32 J | 0.5 U | 0.47 J | | | | | 0.22 J | | | | | | | |
| PW-26A | µg/L | 5 | 1 U | 0.27 J | 0.5 U | 0.5 U | 0.5 U | 0.3 J | 0.5 U | 0.14 J | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | | | | |
| PW-29A | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | | 0.50 U | 0.50 U | | | | |
| PW-47A | µg/L | 5 | 5.5 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.17 J | 0.5 U | 0.5 U | 0.50 U | 0.19 J | 0.15 J | 0.30 J | | | | |
| PW-48A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-49A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-57A | µg/L | 5 | 3.9 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.5 U | | 0.50 U | | | | |
| PW-96A | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.5 U | 0.50 U | 0.50 U | | | 1.00 U | 0.400 U |
| PW-97A | µg/L | 5 | | 0.14 J | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.5 U | 0.50 U | 0.50 U | | | | |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | | | |
| E-11 | µg/L | 5 | | 0.5 U2 | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 4.00 U | 4.00 U |
| EI-5 | µg/L | 5 | | | | | | | | | | | | | | 5.0 U[3] | 6.02 J | 10 U | 4.00 U | 100 U | 10.0 U | 10.0 U |
| FW-1 | µg/L | 5 | 1 U | 2 | 2 | 1 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 J | 0.5 J | 1.14 | 0.82 | 0.50 U | 0.50 U | | 4.00 U | | 0.700 |
| FW-2 | µg/L | 5 | 28.8 | 2.02 | 1.31 | 0.32 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 J | 0.5 J | 1.6 | 0.37 J | 0.50 U | 0.50 U | 0.742 | 0.284 J | | 0.260 J |
| FW-3 | µg/L | 5 | 50 U | 2.02 | 1.77 | 0.26 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 J | 0.5 J | 1.61 | 1.1 | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 1.43 | 0.400 U |
| FW-4 | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 J | 0.5 J | 0.26 J | 0.5 U | 0.50 U | 0.33 J | 0.800 U | 0.642 | 0.230 J | 0.400 U |
| FW-5 | µg/L | 5 | | | | | | | | | | | | | | | | | | | | 1.04 |
| FW-6 | µg/L | 5 | | 0.44 J4 | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.68 | 0.5 U | 0.21 J | 0.500 U | 0.16 J | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| FW-7 | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 J | 0.5 J | 0.5 U | 0.5 U | 0.500 U | 0.500 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| I-2 | µg/L | 5 | | | | | | | | | | | | | | 50 U[3] | 10.6 J | 26.5 J | 20.5 | 29.0 | 40.0 U | 30.6 J |
| I-3 | µg/L | 5 | | | | | | | | | | | | | | 0.5 U[3] | 6.69 | 0.50 U | 2.5 J | 0.4 U | 1.7 | 4.00 U |
| MW-01A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 4.00 U | 4.00 U |
| MW-02A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 4.00 U | 4.00 U |
| MW-03A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 4.00 U | 4.00 U |
| MW-04A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 4.00 U | 4.00 U |
| PW-01A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.41 J | 0.35 J | 0.400 U | 0.400 U | 0.840 | 0.650 |
| PW-03A | µg/L | 5 | 1.1 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-10 | µg/L | 5 | 2.1 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.79 | 1.91 | 0.79 | 1.75 | 1.2 | 0.74 | 1.16 | 1.2 | 1.14 | 1.06 | 1.16 | 1.20 |
| PW-11 | µg/L | 5 | 3.3 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.98 | 0.77 | 0.67 | 5.55 | 5 U | 1.32 | 0.94 | 0.88 | 0.55 | 0.66 | 1.97 | 0.392 J | 0.43 | 0.250 J | 4.00 U |
| PW-12 | µg/L | 5 | 34 | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 7.27 | 4.35 | 3.33 | 7.05 | 25 U | 25 U | 6.67 | 4.22 | 3.83 | 1.4 | 1.08 | 2.66 | 2.60 J | 4.00 U | 0.841 |
| PW-13 | µg/L | 5 | 2.8 | 2.1 J | 2.5 U | 2.5 U | 2.5 U | 0.33 J | 0.5 U | 0.5 U | 1.87 J | 25 U | 25 U | 3.16 J | 0.54 | 1.1 | 0.91 | 1.21 | 20.0 U | 8.00 U | 4.00 U | 4.00 U |
| PW-14 | µg/L | 5 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-15AR | µg/L | 5 | 5 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-16A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.5 U | 0.5 U | 0.5 U | 0.400 U | | 0.400 U | 0.4 U |
| PW-19A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-20A | µg/L | 5 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-30A | µg/L | 5 | 1 | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 0.22 J | 0.22 J | 0.4 J | 0.5 U | 5 U | 5 U | 0.31 J | 0.33 J | 0.16 J | 0.37 J | 0.75 | 2.00 U | 2.00 U | 1.00 U | 1.00 U |
| PW-31A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-42A | µg/L | 5 | 2.5 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.59 | 0.5 U | 2.56 | 0.5 U | 0.5 U | 0.25 J | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 1.020 | 1.860 | 1.250 | 2.740 |
| PW-45A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |

**Table 5c. PCE Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-46A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-68A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.4 U | 0.400 U | 0.400 U |
| PW-69A | µg/L | 5 | **9** | **8.21** | **6.69** | **7.12** | 4.26 | **5.71** | **8.55** | **7.68** | **5.06** | 0.48 J | 4 J | 3.61 | 2.13 | 2.77 | **7.47** | **6.48** | **10.8** | 2.07 J | **5.95** | 1.38 |
| PW-70AR | µg/L | 5 | 1 U | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-71A | µg/L | 5 | 2.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 4.000 U | 4.000 U |
| PW-72A | µg/L | 5 | 1 U | | | | | | | | | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-73B | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-74B | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-75A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-76A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-77A | µg/L | 5 | 50 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.27 J | 0.26 J | 0.23 J | 0.19 J | 0.21 J | 0.5 U | 0.2 J | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-78A | µg/L | 5 | 2 U | 0.72 | 0.5 U | 0.44 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.65 | 0.52 | 0.75 | 0.75 | 0.61 | 0.8 | 0.80 | 0.70 | 0.825 | 0.72 | 0.613 | 0.560 |
| PW-79A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.22 J | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.5 U | 0.34 J | 0.58 | 0.798 | 0.68 | 0.58 | 0.363 J |
| PW-80A | µg/L | 5 | 3.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.45 J | 0.34 J | 0.35 J | 0.36 J | 0.719 | 0.38 J | 0.861 | 0.558 |
| PW-81A | µg/L | 5 | 1 U | | | | | | | | | | | | 0.40 J | | | | | | | 0.400 U |
| PW-82A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-83A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-84AR | µg/L | 5 | 1 U | 0.11 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.69 | 0.72 | 0.49 J | 0.29 J | 0.4 J | 0.32 J | 0.27 J | 0.5 U | 0.26 J | 0.54 | 0.537 | 0.89 | 1.03 | 1.73 |
| PW-85A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.68 | 0.81 | 0.72 | 0.65 | 0.33 J | 0.46 J | 0.35 J | 0.24 J | 0.43 J | | 0.341 J | 0.76 | 0.655 | 1.34 |
| PW-86A | µg/L | 5 | 2.8 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.46 | 0.5 U | 0.50 U | 0.17 J | 0.55 | | 0.582 J | 0.469 | 0.500 U | 0.230 J |
| PW-87A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-88A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-89A | µg/L | 5 | 1.1 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.23 J | 0.5 U | 0.23 J | 0.2 J | 0.16 J | 0.20 J | 0.19 J | 0.4 J | 0.48 J | 0.380 J | 0.749 | 0.652 | 0.666 |
| PW-91A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.54 | 0.5 U | 0.50 U | 1.36 | 0.15 J | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-92A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-93A | µg/L | 5 | | **32** | **5** J | **14** | 1.18 J | **19** | 3.92 | 3.12 | 0.98 | 5 U | 0.32 J | 0.35 J | 0.22 J | 0.44 J | 2.18 | 0.63 | 0.702 | 2.49 J | 1.05 J | **5.25** |
| PW-94A | µg/L | 5 | | 0.5 U | 0.1 J | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 1.16 | 25 U | 25 U | 1.31 J | **5.7** | 1.66 J | 2.29 J | 2.2 J | 4.00 U | 2.24 | 4.00 U | 2.70 |
| PW-95A | µg/L | 5 | | 1.51 | 1.12 | 0.65 | 0.78 | | 1.67 | 1.25 | 1.22 | 3.27 | 25 U | 0.68 | 1.06 | 0.65 | 2.11 | 0.84 | 0.257 J | 0.639 | 1.68 | 3.70 J |
| PW-98A | µg/L | 5 | | **6.84** | 3.59 | 3.11 | 1.57 | 0.2 U | 0.25 J | 0.5 U | 0.8 | 5 U | 5 U | 2.66 | 4.5 | 2.08 | **5.82** | **7.37** | 4.70 | **14.2** | 2.85 | 2.24 J |
| PW-99A | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 3.68 | 3.55 | 2.78 | 0.31 J | 1.83 J | 5 U | 0.18 J | 0.26 J | 1.05 | 0.54 | 1.97 | 0.786 | 4.00 U | 1.00 U | 5.00 U |
| PW-100A | µg/L | 5 | | **7.23** | 2.99 | 2.46 | 1.45 | 4.14 | 0.49 J | 0.41 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | **6.77** | **9.4** | **10.1** | 0.982 | 4.20 | 1.60 J |
| PW-101A | µg/L | 5 | | 0.5 U | **5.28** | 3.89 | 4.18 | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.4 U | 0.400 U | 0.4 U |

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

[3] Initial samples were collected in fall 2016 for EI-5, I-2, and I-3.

10-year rolling table. Refer to past annual reports for a full records of historical concentrations.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

µg/L = micrograms per liter

E = estimated value above the calibration range

J = estimated value

PCE = tetrachloroethene

U = not detected above reporting limit

**Table 5d. TCE Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | | | | |
| EW-4 | µg/L | 5 | | 6.32 | 0.58 | 0.5 U | 0.5 U | 1.49 | 0.41 J | 0.33 J | | | | | 0.27 J | 0.22 J | | | | | | |
| EW-5 | µg/L | 5 | | 1.24 | 0.5 U | 0.5 U | 0.5 U | 0.73 | 1.77 | 4.77 | | | | | 1.13 | 0.72 | | | | | | |
| EW-6 | µg/L | 5 | | 1.01 | 0.5 U | 0.5 U | 0.5 U | 0.51 | 1.32 | 0.86 | | | | | 0.50 U | 0.50 U | | | | | | |
| PW-25A | µg/L | 5 | 6.5 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.76 | 0.44 J | 1.54 | | | | | 0.49 J | | | | | | | |
| PW-26A | µg/L | 5 | 8.1 | 0.57 | 0.5 U | 0.5 U | 0.5 U | 1.66 | 0.5 U | 0.76 | 0.7 | 0.65 | 0.52 | 0.48 J | 0.42 J | 0.36 J | 0.61 | 0.68 | | | | |
| PW-29A | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.2 J | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | | 0.50 U | 0.34 J | | | | |
| PW-47A | µg/L | 5 | 38.4 | 0.76 | 0.5 U | 0.5 U | 0.5 U | 1.23 | 0.5 U | 1.46 | 2 | 1.6 | 0.82 | 0.65 | 0.42 J | 0.90 | 0.93 | 1.21 | | | | |
| PW-48A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-49A | µg/L | 5 | 8.4 | 0.25 J | 0.5 U | 0.5 U | 0.5 U | 0.23 J | 0.5 U | 0.19 J | | | | | 0.50 U | | | | | | | |
| PW-57A | µg/L | 5 | 32.8 | 0.31 J | 0.5 U | 0.5 U | 0.5 U | 0.68 | 0.5 U | 0.77 | 0.81 | 0.31 J | 0.64 | 0.2 J | 0.58 | 0.73 | | 1.11 | | | | |
| PW-96A | µg/L | 5 | | 1.9 | 0.5 U | 0.5 U | 0.5 U | 0.64 | 0.5 U | 0.21 J | 3.53 | 7.24 | 0.21 J | 0.5 U | 0.50 U | 1.04 | 0.61 | 0.50 U | | | 3.04 | 3.02 |
| PW-97A | µg/L | 5 | | 4.58 | 0.5 U | 0.5 U | 0.5 U | 1.23 | 0.5 U | 0.45 J | 0.2 U | 0.32 J | 0.2 J | 0.5 U | 0.50 U | 0.5 U | 0.49 J | 0.50 U | | | | |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | | | |
| E-11 | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.40 U | 0.40 U |
| EI-5 | µg/L | 5 | | | | | | | | | | | | | | 5.0 U[3] | 24 | 10 U | 3.0 J | 100 U | 20.0 U | 10.0 U |
| FW-1 | µg/L | 5 | 1 U | 7 | 4 | 0 J | 1 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.83 | 1.98 | 0.50 U | 0.50 U | | 4.00 U | | 6.78 |
| FW-2 | µg/L | 5 | 438 D | 103 | 87 | 60.9 | 54.4 | 44.3 | 26.1 | 22.1 | 19.4 | 22.8 | 19.3 | 72.3 | 22.4 | 6.48 | 0.46 J | 0.38 J | 9.17 | 6.40 | | 4.34 |
| FW-3 | µg/L | 5 | 190 | 4.68 | 4.21 | 0.34 J | 0.5 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 25.3 | 27.6 | 8.14 | 0.53 | 0.28 J | 0.230 J | 0.241 J | 7.17 | 0.400 U |
| FW-4 | µg/L | 5 | | 1.22 | 0.87 | 0.31 J | 0.5 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.81 | 0.92 | 0.39 J | 0.71 | 0.89 | 0.880 | 1.32 | 0.640 | 0.643 |
| FW-5 | µg/L | 5 | | | | | | | | | | | | | 5.78 | | | | | 41.8 | | 23.5 |
| FW-6 | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.99 | 0.5 U | 0.5 U | 0.500 U | 0.5 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| FW-7 | µg/L | 5 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.500 U | 0.500 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| I-2 | µg/L | 5 | | | | | | | | | | | | | | 34.5 J[3] | 38.4 | 78.3 | 84.5 | 83.3 | 110 | 67.5 |
| I-3 | µg/L | 5 | | | | | | | | | | | | | | 0.5 U[3] | 34 | 0.5 U | 7.80 | 0.297 J | 0.47 | 0.400 U |
| MW-01A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| MW-02A | µg/L | 5 | 2.4 | 0.2 J | 0.5 U | 0.5 U | 0.5 U | 0.42 J | 0.26 J | 0.21 J | 0.32 J | 0.33 J | 0.5 U | 0.2 J | 0.17 J | 0.25 J | 0.22 J | 0.50 U | 0.400 U | 0.239 J | 0.200 J | 0.400 U |
| MW-03A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.34 J | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| MW-04A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-01A | µg/L | 5 | 5.5 | 0.56 | 0.5 U | 0.33 J | 0.5 U | 0.5 U | 2.26 | 2 | 2.18 | 1.42 | 1.56 | 1.43 | 0.94 | 0.94 | 1.26 | 0.64 | 1.10 | 1.31 | 2.13 | 2.26 |
| PW-03A | µg/L | 5 | 6.4 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.16 J | 0.43 J | 0.720 | 1.13 | 1.94 | 3.42 |
| PW-10 | µg/L | 5 | 6 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.55 | 1.63 | 1.89 | 2.04 | 1.04 | 0.97 | 1.14 | 1.38 | 1.14 | 1.38 | 1.32 | 1.24 |
| PW-11 | µg/L | 5 | 13.9 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 3.38 | 2.31 | 1.02 | 22.6 | 4.78 J | 2.08 | 2.44 | 3.5 | 0.96 | 0.80 | 4.73 | 0.320 J | 0.63 | 0.200 J | 0.400 U |
| PW-12 | µg/L | 5 | 186 | 5.52 | 1.02 J | 2.5 U | 2.5 U | 12.4 | 19.8 | 16.2 | 153 | 134 | 128 | 143 | 98.8 | 54.3 | 33.6 | 26.5 | 20.2 | 19.4 | 7.23 | 10.8 |
| PW-13 | µg/L | 5 | 14.1 | 10.1 | 2.5 U | 1.2 J | 2.5 U | 1.27 | 1.21 | 1.03 | 9 | 16.2 J | 13.6 J | 15.7 | 2.19 | 4.98 | 3.82 | 5.3 | 13.8 J | 10.1 | 18.2 | 24.3 |
| PW-14 | µg/L | 5 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-15AR | µg/L | 5 | 5 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-16A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.18 J | 0.5 U | 0.5 U | 0.400 U | | 0.400 U | 0.400 U |
| PW-19A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-20A | µg/L | 5 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-30A | µg/L | 5 | 5 | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 0.64 | 0.52 | 1.16 | 0.77 | 5 U | 5 U | 0.95 | 1.21 | 0.43 J | 0.96 | 1.77 | 2.00 U | 1.88 J | 0.700 J | 1.00 U |
| PW-31A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-42A | µg/L | 5 | 112 | 8.7 | 6.2 | 5.7 | 3.7 | 2.65 | 28.6 | 2.03 | 142 | 1.3 | 4.21 | 28 | 8.47 | 0.92 | 46.2 | 57.3 | 53.9 | 80.9 | 68.0 | 166 |
| PW-45A | µg/L | 5 | 3.5 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |

**Table 5d. TCE Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-46A | µg/L | 5 | **5.2** | 3.33 | 2.11 | 1.86 | 1.89 | 2.96 | 1.34 | 2.4 | 0.5 U | 1.19 | 0.5 U | 0.5 U | 0.50 U | 0.62 | 0.88 | 0.50 U | 0.339 J | 0.400 U | 1.29 | 0.540 |
| PW-68A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-69A | µg/L | 5 | **11** | **5.3** | 4.23 | 3.96 | 1.96 | 2 U | 1.37 | 1.26 | 1.04 | 0.18 J | 5 U | 0.43 J | 0.24 J | 0.31 J | 0.82 | 0.73 | 2.00 U | 4.00 U | 2.00 U | 0.35 J |
| PW-70AR | µg/L | 5 | 1 U | | 0.17 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-71A | µg/L | 5 | **13.6** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.52 | 0.46 J | 0.45 J | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-72A | µg/L | 5 | 1 U | | | | | | | | | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-73B | µg/L | 5 | **31** | 2.52 | 1.29 | 0.89 | 0.26 J | 3.4 | 0.5 U | 1.35 | 1.65 | 1.53 | 1.63 | 0.5 U | 2.14 | 1.62 | 2.85 | 1.55 | 3.17 | 1.37 | 1.13 | 1.91 |
| PW-74B | µg/L | 5 | 3.7 | 0.67 | 0.5 U | 0.33 J | 0.5 U | 1.26 | 0.5 U | 1.03 | 0.56 | 0.36 J | 0.81 | 0.5 | 0.53 | 0.29 J | 0.52 | 0.39 J | 0.410 | 0.350 J | 0.375 J | 0.320 J |
| PW-75A | µg/L | 5 | **6.3** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.17 J | 0.20 J | 0.50 U | 0.400 U | 0.400 U | 0.200 J | 0.400 U |
| PW-76A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.35 J | 0.35 J | 0.27 J | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-77A | µg/L | 5 | 50 U | 1.98 | 1.72 | 1.45 | 0.69 | 0.31 J | 0.24 J | 0.18 J | 1.98 | 1.91 | 1.96 | 1.84 | 1.83 | 1.12 | 1.73 | 1.03 | 1.42 | 1.37 | 1.08 | 1.05 |
| PW-78A | µg/L | 5 | 2 U | 1.94 | 0.75 | 0.63 | 0.55 | 0.5 U | 0.21 J | 0.5 U | 1.96 | 2 | 2.33 | 2.29 | 1.96 | 2.27 | 2.46 | 2.15 | 2.10 | 2.12 | 2.21 | 1.41 |
| PW-79A | µg/L | 5 | 1.4 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.21 | 0.91 | 0.5 U | 0.19 J | 0.44 J | 0.5 U | 1.11 | 2.33 | 1.84 | 1.88 | 1.29 | 1.09 |
| PW-80A | µg/L | 5 | **19.7** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.28 J | 0.5 U | 0.32 J | 1.14 | 1.96 | 0.77 | 0.81 | 1.64 | 0.810 | 2.77 | 1.38 |
| PW-81A | µg/L | 5 | 1 U | | | | | | | | | | | | 1.41 | | | | | | | 0.850 |
| PW-82A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-83A | µg/L | 5 | 1.8 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-84AR | µg/L | 5 | 1.2 | 3.34 | 1.69 | 1.48 | 0.67 | 1.11 | **5.89** | **6.35** | **5.68** | **8.38** | 2.96 | **6.51** | 4.81 | 3.64 | **7.19** | **24.7** | **31.6** | **46.5** | **53.5** | **78.9** |
| PW-85A | µg/L | 5 | 4.3 | 1.89 | 0.68 | 0.81 | 0.23 J | 0.61 | 1.76 | 2.21 | 1.85 | 1.75 | 1.09 | 2.16 | **7.74** | **5.09** | **8.41** | | **14.5** | **35.2** | **25.0** | **48.8** |
| PW-86A | µg/L | 5 | **373** | 3.56 | 0.74 | 2.41 | 0.47 J | 1.11 | 0.98 | 0.72 | 1.05 | 0.32 J | **57.7** | 0.52 | 0.22 J | 4.73 | **20.1** | | **18.9** | **14.7** | **13.3** | **10.2** |
| PW-87A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-88A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.29 J | 0.46 J | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.42 J | 2.56 | 1.89 | 0.760 | 2.34 | 0.400 U |
| PW-89A | µg/L | 5 | **20.3** | 0.77 | 0.62 | 0.26 J | 0.5 U | 0.5 U | 0.5 U | 0.88 | 1.07 | 1.57 | 1.29 | 0.78 | 0.34 J | 1.64 | **9.22** | **10.4** | **5.71** | **9.00** | **21.4** | **19.8** |
| PW-91A | µg/L | 5 | 4.3 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.39 J | 0.5 U | 0.25 J | 0.5 U | 0.27 J | 0.65 | 0.21 J | 0.27 J | 0.96 | 0.34 J | 0.15 J | 0.207 J | 0.400 U | 0.327 J | 0.400 U |
| PW-92A | µg/L | 5 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-93A | µg/L | 5 | | **17** J | **29** | 2 J | **17.4** | **31.3** | 2.71 | 2.54 | 1.16 | 5 U | 0.25 J | 0.2 J | 0.16 J | 0.16 J | 0.62 | 0.49 J | 0.386 J | 4.00 U | 2.00 U | 2.28 |
| PW-94A | µg/L | 5 | | 0.31 J | 0.23 J | 0.5 U | 0.5 U | 0.26 J | 0.28 J | 0.5 U | 2.88 | 25 U | 25 U | 1.58 J | 4.29 J | 2.72 J | 2.56 | 3.06 | 4.00 U | 2.49 | 0.400 U | 1.50 J |
| PW-95A | µg/L | 5 | | 2.3 | 0.68 | 1.9 | 0.23 J | | 0.46 J | 0.5 U | 1.43 | 0.51 | 25 U | 0.65 | 0.86 | 0.58 | 2.84 | 1.12 | 0.320 J | 0.638 | 2.88 | 4.50 |
| PW-98A | µg/L | 5 | | **108** | **26.3** | **46.1** | **18.4** | 0.2 U | 1 | 0.78 | **8.1** | 5 U | 5 U | **52.1** | **59.9** | **27.3** | **41.1** | **38.7** | **32.1** | **44.6** | **21.8** | **20.7** |
| PW-99A | µg/L | 5 | | 0.23 J | 0.5 U | 0.5 U | 0.5 U | **50.5** | **49.6** | **41.3** | 1.08 | **72.6** | **46.7** | 0.52 | 0.82 | 3.65 | 1.3 | **5.58** | 1.93 | 2.60 | 1.35 J | 0.60 J |
| PW-100A | µg/L | 5 | | **43** | **5.37** | **5.11** | 4.81 | 2.96 | 0.37 J | 0.33 J | 0.3 J | 0.5 U | 0.5 U | 0.5 U | 0.73 | 0.50 U | **8.61** | **10.9** | **8.54** | 1.39 | 2.80 J | 1.00 U |
| PW-101A | µg/L | 5 | | 0.12 J | 4.02 | 3.89 | 1.84 | 0.32 J | 0.61 | 0.59 | 0.5 U | 0.17 J | 0.5 U | 0.44 J | 0.28 J | 0.71 | 0.74 | 0.43 J | 0.526 | 0.458 | 4.200 | 1.63 |

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

[3] Initial samples were collected in fall 2016 for EI-5, I-2, and I-3.

10-year rolling table. Refer to past annual reports for a full records of historical concentrations.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

µg/L = micrograms per liter

D = diluted

E = estimated value above the calibration range

J = estimated value

TCE = trichloroethene

U = not detected above reporting limit

**Table 5e. DCE Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | | | | |
| EW-4 | µg/L | 7 | | 0.17 J | 0.5 U | 0.5 U | 0.5 U | 0.39 J | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | | | | | | |
| EW-5 | µg/L | 7 | | 1.16 | 0.5 U | 0.5 U | 0.5 U | 0.35 J | 0.23 J | 0.35 J | | | | | 0.50 U | 0.50 U | | | | | | |
| EW-6 | µg/L | 7 | | 0.58 | 0.5 U | 0.5 U | 0.5 U | 1.83 | 0.34 J | 0.5 U | | | | | 0.50 U | 0.50 U | | | | | | |
| PW-25A | µg/L | 7 | 2.6 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.43 J | 0.28 J | 1.03 | | | | | 0.34 J | | | | | | | |
| PW-26A | µg/L | 7 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | | | | |
| PW-29A | µg/L | 7 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.23 J | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | | 0.50 U | 0.50 U | | | | |
| PW-47A | µg/L | 7 | 11.7 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.22 J | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.20 J | 0.19 J | | | | |
| PW-48A | µg/L | 7 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-49A | µg/L | 7 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-57A | µg/L | 7 | 8.1 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.17 J | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | | 0.50 U | | | | |
| PW-96A | µg/L | 7 | | 0.88 | 0.5 U | 0.5 U | 0.5 U | 0.59 | 0.5 U | 0.37 J | 1.88 | 3.22 | 0.27 J | 0.5 U | 0.50 U | 0.29 J | 0.33 J | 0.50 U | | | 1.15 | 0.770 |
| PW-97A | µg/L | 7 | | 3.02 | 0.5 U | 0.5 U | 0.5 U | 1.03 | 0.5 U | 0.33 J | 0.34 J | 0.29 J | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.22 J | 0.50 U | | | | |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | | | |
| E-11 | µg/L | 7 | | 0.5 U | 0.52 | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.28 J | 0.65 | 0.56 | 1.87 | 1.25 | 0.50 U | 0.62 | 4.92 | 13.0 | 15.3 | 13.0 | 15.3 |
| EI-5 | µg/L | 7 | | | | | | | | | | | | | | 6.3 [3] | 1,270 | 105 | 212 | 100 U | 48.5 | 10.0 U |
| FW-1 | µg/L | 7 | 1 U | 245 | 239 | 168 | 108 | 78.3 | 76.1 | 49.3 | 45.8 | 39.4 | 40.2 | 45.1 | 81.4 | 47.1 | 88.2 | 103 | | 41.9 | | 1.36 |
| FW-2 | µg/L | 7 | 47.3 | 14.6 | 13.8 | 13.3 | 10.1 | 6.54 | 5.23 | 2.56 | 2.07 | 3.24 | 0.5 U | 4.58 | 0.2 J | 0.22 J | 0.50 U | 0.50 U | 0.400 U | 0.234 J | | 0.200 |
| FW-3 | µg/L | 7 | 11,600 E | 158 | 138 | 7.18 | 6.03 | 2.45 | 4.11 | 3.14 | 3.36 | 2.12 | 13.2 | 151 | 130 | 82 | 1.82 | 1.56 | 1.52 | 1.66 | 97.7 | 0.274 |
| FW-4 | µg/L | 7 | | 28.6 | 30.1 | 9.74 | 7.07 | 6.81 | 4.23 | 4.12 | 2.01 | 1.11 | 44.4 | 16.9 | 20.2 | 8.88 | 15.9 | 18.1 | 18.4 | 29.2 | 13.2 | 11.0 |
| FW-5 | µg/L | 7 | | | | | | | | | | | | | 0.25 J | | | | | | | 2.35 |
| FW-6 | µg/L | 7 | | 4.82 | 0.5 U | 0.18 J | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 3.38 | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.325 J |
| FW-7 | µg/L | 7 | | 0.61 | 0.58 | 0.36 J | 0.33 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 11.3 | 2.02 | 17.6 | 0.50 U | 19.3 | 25.4 | 22.4 | 5.40 |
| I-2 | µg/L | 7 | | | | | | | | | | | | | | 2,850 [3] | 2,080 | 3,260 | 2,110 | 3,050 | 2,990 | 3,290 |
| I-3 | µg/L | 7 | | | | | | | | | | | | | | 3.87 [3] | 2,440 | 9.51 | 1,830 | 52.4 | 95.6 | 3.96 |
| MW-01A | µg/L | 7 | 131 | 1.31 | 0.56 | 0.89 | 0.12 J | 12.6 | 15.3 | 12.8 | 46.8 | 36.1 | 35.6 | 41.8 | 25.3 | 32.80 | 38.50 | 38.40 | 42.7 | 74 | 48.3 | 43.7 |
| MW-02A | µg/L | 7 | 455 | 58.2 | 52.8 | 41.3 | 35.6 | 52.9 | 30 | 24.3 | 29.1 | 26.8 | 0.5 U | 12.5 | 8.38 | 9.83 | 9.35 | 4.14 | 5.28 | 12.3 | 15.5 | 20.2 |
| MW-03A | µg/L | 7 | 9.6 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 21.9 | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 1.99 | 0.616 | 0.462 | 0.220 J | 2.320 |
| MW-04A | µg/L | 7 | 224 | 35.4 | 28.6 | 22.2 | 12.4 | 21 | 56.5 | 52.6 | 33.3 | 28.1 | 26 | 24.4 | 8.5 J | 11.5 | 12.3 | 10.8 | 4.25 | 11.7 | 7.96 | 12.3 |
| PW-01A | µg/L | 7 | 57.7 | 1.22 | 1.13 | 0.89 | 0.51 | 0.66 | 24.1 | 25.5 | 30.7 | 11.6 | 15.6 | 12.7 | 13.0 | 13.6 | 1.48 | 0.50 U | 28.9 | 29 | 0.46 | 1.97 |
| PW-03A | µg/L | 7 | 156 | 1.25 | 0.72 | 0.98 | 0.5 U | 0.56 | 1.33 | 1.05 | 1.01 | 0.68 | 0.42 J | 0.45 J | 0.36 J | 0.24 J | 0.60 | 0.75 | 2.32 | 2.66 | 3.22 | 3.85 |
| PW-10 | µg/L | 7 | 18.6 | 2.55 | 3.51 | 1.45 | 1.38 | 0.79 | 0.58 | 0.49 J | 4.73 | 6.06 | 2.72 | 3.76 | 2.3 | 2.41 | 2.79 | 2.92 | 1.98 | 2.25 | 2.33 | 2.99 |
| PW-11 | µg/L | 7 | 118 | 2.11 | 1.15 | 1.64 | 0.73 | 13.1 | 12.99 | 10.84 | 267 | 204 | 34.4 | 131 | 214 | 4.66 | 11.30 | 28.6 | 7.92 | 21.6 | 3.61 | 2.46 |
| PW-12 | µg/L | 7 | 9,830 | 611 | 489 | 235 | 175 | 343 | 1,350 E | 1,280 | 335 | 266 | 233 | 340 | 196 | 175 | 54.8 | 40 | 155 | 120 | 15.6 | 39 |
| PW-13 | µg/L | 7 | 773 | 352 | 263 | 189 | 135 | 50.7 | 48.6 | 46.2 | 327 | 520 | 390 | 545 | 95.6 | 177 | 157 | 201 | 525 | 379 | 588 | 878 |
| PW-14 | µg/L | 7 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-15AR | µg/L | 7 | 5 U | | | | | | | | | | | | 0.20 J | | | | | | | |
| PW-16A | µg/L | 7 | 1.7 | 0.61 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.29 J | 0.75 | 0.29 J | 0.20 J | 0.400 U | | 0.400 U | 0.400 U |
| PW-19A | µg/L | 7 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-20A | µg/L | 7 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-30A | µg/L | 7 | 117 | 18.8 | 12.2 | 7.5 | 8.4 | 16.2 | 9.96 | 26.6 | 17.1 | 22.2 | 14.4 | 23.1 | 33.3 | 13.4 | 23.4 | 32.4 | 20.9 | 34.0 | 16.4 | 20.0 |
| PW-31A | µg/L | 7 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-42A | µg/L | 7 | 69.3 | 30.9 | 27.6 | 18.1 | 13.5 | 12.5 | 27 | 19.7 | 19 | 23.9 | 17.5 | 11.2 | 9.00 | 8.12 | 6.34 | 4.56 | 7.81 | 8.41 | 11.8 | 9.78 |
| PW-45A | µg/L | 7 | 164 D | 2.22 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 4.46 | 7.42 | 1.1 | 3.42 | 5.15 | 0.30 J | 0.79 | 3.11 | 2.46 | 5.07 | 4.64 | 6.09 |

**Table 5e. DCE Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-46A | μg/L | 7 | **9.2** | 6.94 | 5.69 | 3.14 | 3.48 | 5.71 | 2.14 | 4.33 | 0.5 U | 2.16 | 0.5 U | 0.5 U | 0.50 U | 0.91 | 1.30 | 0.50 U | 0.509 | 0.400 U | 1.72 | 0.674 |
| PW-68A | μg/L | 7 | **222** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.750 | 0.400 U | 0.400 U |
| PW-69A | μg/L | 7 | **247** | **31.2** | **44.3** | **28.4** | **28.6** | 5.92 | **9.73** | **8.21** | **13.2** | 1.25 | **10.4** | **8.48** | 6.28 | 5.21 | **14.5** | **17.4** | **30.9** | **8.08** | **9.95** | **7.99** |
| PW-70AR | μg/L | 7 | 1 U | | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-71A | μg/L | 7 | **74.2** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.01 | 0.9 | 3.23 | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.494 | 0.400 U | 1.01 | 0.400 U |
| PW-72A | μg/L | 7 | 2.2 | | | | | | | | | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-73B | μg/L | 7 | **56.8** | 6.98 | 4.18 | 5.11 | 1.28 | 3.81 | 0.89 | 1.46 | 1.77 | 1.64 | 1.52 | 0.5 U | 1.89 | 1.40 | 2.39 | 1.40 | 2.66 | 1.26 | 0.821 | 1.75 |
| PW-74B | μg/L | 7 | 5.1 | 1.82 | 1.25 | 0.76 | 0.63 | 2.84 | 0.51 | 2.22 | 1.12 | 0.82 | 1.66 | 1 | 1.02 | 0.53 | 0.99 | 0.71 | 0.866 | 0.550 | 0.713 | 0.530 |
| PW-75A | μg/L | 7 | **51.4** | 5.78 | 5.18 | 3.16 | 3.67 | 2.9 | 2.63 | 2.34 | 2.88 | 1.72 | 2.11 | 1.61 | 1.99 | 3.35 | 3.53 | 1.89 | 4.19 | 3.97 | 3.94 | 3.48 |
| PW-76A | μg/L | 7 | 6.9 | 0.54 | 0.5 U | 0.26 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.22 J | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-77A | μg/L | 7 | **90.7** | **33.8** | **26.5** | **26.4** | **18.4** | **16.3** | **14.8** | **12.4** | **18.8** | **16.3** | **15.4** | **18.3** | **16** | **9.38** | **15.7** | **10.0** | **17.7** | **17.9** | **12.2** | **9.74** |
| PW-78A | μg/L | 7 | **67** | **68.7** | **57.6** | **42.3** | **46.2** | **38.2** | **34.2** | **31.3** | **74.7** | **69** | **77.3** | **84.1** | **66.3** | **77.2** | **84.0** | **83.5** | **82.9** | **79** | **73.8** | **43.6** |
| PW-79A | μg/L | 7 | **16.6** | 3.09 | 2.64 | 1.56 | 0.76 | 0.72 | 0.61 | 0.59 | 5.42 | 3.66 | 0.5 U | 1.14 | 2.54 | 0.50 U | **10.5** | **9.79** | **12.9** | **15.2** | **8.95** | 6.80 |
| PW-80A | μg/L | 7 | **93.6** | 0.99 | 0.25 J | 0.88 | 0.5 U | 0.64 | 0.5 U | 0.5 U | 0.86 | 2.45 | 0.57 | 1.33 | **8.26** | **15.5** | 4.59 | 4.23 | **10.1** | 4.20 | **19.3** | 6.65 |
| PW-81A | μg/L | 7 | 1 U | | | | | | | | | | | | **7.53** | | | | | **25.2** | | 0.940 |
| PW-82A | μg/L | 7 | **9.3** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-83A | μg/L | 7 | **64** | 1.89 | 1.26 | 1.11 | 0.21 J | 0.5 U | 2.76 | 1.36 | 1.52 | 2.19 | 1.49 | 0.82 | 0.88 | 0.80 | 0.93 | 0.79 | 1.38 | 0.990 | 0.964 | 0.910 |
| PW-84AR | μg/L | 7 | **22.9** | 3.98 | 2.56 | 2.58 | 0.54 | 1.46 | **8.24** | **8.82** | **7.01** | **7.62** | 5.9 | 6.45 | 5.78 | 3.84 | 5.43 | 6.29 | **8.61** | **9.87** | **11.4** | **14.0** |
| PW-85A | μg/L | 7 | **76.9** | **18.2** | **11.8** | **10.2** | **8.49** | **8.12** | **7.32** | **9.32** | **7.33** | 6.81 | 3.71 | 4.44 | 6.2 | 4.05 | 5.4 | | **9.69** | **10.3** | **7.42** | **10.6** |
| PW-86A | μg/L | 7 | **169** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 3.06 | 0.5 U | 0.50 U | 0.29 J | 0.65 | | 1.10 | 1.04 | 1.06 | 1.02 |
| PW-87A | μg/L | 7 | 1.4 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.24 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.24 J | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-88A | μg/L | 7 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-89A | μg/L | 7 | 3.5 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.47 J | 0.48 J | 0.410 | 0.60 | 1.92 | 1.80 |
| PW-91A | μg/L | 7 | **70.6** | 0.88 | 0.69 | 0.76 | 0.33 J | 3.28 | 0.5 U | 2.5 | 2.63 | 1.74 | 1.02 | 1.78 | 1.97 | 1.01 | 1.46 | 3.32 | 3.44 | 4.31 | 2.50 | 1.86 |
| PW-92A | μg/L | 7 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-93A | μg/L | 7 | | **905** | **512** | **785** | **315** | **1280** | **140** | **128** | **16.2** | **9.77** | **11.8** | **17.2** | **7.54** | 6.71 | **14.8** | **14.9** | **21.4** | **13.40** | **14.70** | **26.70** |
| PW-94A | μg/L | 7 | | 1.9 | **11.1** | 0.23 J | **8.12** | 4.04 | 5.16 | 4.99 | **10.1** | **71** | **97.3** | **90.8** | **116** | **110** | **122** | **122** | **154** | **138** | **57.8** | **80.6** |
| PW-95A | μg/L | 7 | | **15.2** | **15.5** | **8.18** | **12.3** | | **9.56** | **9.21** | **10.5** | 4.55 | **43.9** | **19.9** | **28.8** | **14.1** | **104** | **49.5** | **12.2** | **39.3** | **68.2** | **191** |
| PW-98A | μg/L | 7 | | **495** | **427** | **125** | **245** | **31.8** | **134** E | **126** | **28.3** | **110** | **203** | **651** | **1,110** | **588** | **1,390** | **1,340** | **1,120** | **2,830** | **772** | **830** |
| PW-99A | μg/L | 7 | | **232** | **186** | **155** | **143** | **135** E | **123** | **125** | **143** | **303** | **145** | **110** | **132** | **365** E | **375** | **262** | **773** | **516** | **368** | **139** |
| PW-100A | μg/L | 7 | | 6.09 | **103** | **99.9** | **81.4** | **43.6** | 1.85 | 1.78 | 0.45 J | 0.37 J | 0.31 J | 0.5 U | 0.50 U | 0.50 U | **77.3** | **128** | **168** | 2.4 | **51.0** | 1.50 J |
| PW-101A | μg/L | 7 | | 0.16 | **286** | **183** | **64.8** | 0.33 J | 0.5 U | 0.5 U | 0.55 | 0.35 J | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.17 J | 0.16 J | 1.66 | 0.615 | 0.400 U | 2.13 |

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

[3] Initial samples were collected in fall 2016 for EI-5, I-2, and I-3.

10-year rolling table. Refer to past annual reports for a full records of historical concentrations.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

μg/L = micrograms per liter

D = diluted

DCE = 1,1-dichloroethene

E = estimated value above the calibration range

J = estimated value

U = not detected above reporting limit

**Table 5f. VC Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | | | | |
| EW-4 | µg/L | 2 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | | | | | | |
| EW-5 | µg/L | 2 | 2 U | 1.49 | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.8 | | | | | 0.50 U | 0.50 U | | | | | | |
| EW-6 | µg/L | 2 | | 0.58 | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.70 | 0.64 | | | | | | |
| PW-25A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-26A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 1.18 | | | | |
| PW-29A | µg/L | 2 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | | 0.50 U | 0.50 U | | | | |
| PW-47A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.95 | 0.5 U | 0.73 | 0.4 J | 0.25 J | 0.42 J | 0.5 U | 0.27 J | 0.50 U | 0.50 U | 0.50 U | | | | |
| PW-48A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-49A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | | | | | | | |
| PW-57A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.26 J | 0.5 U | 0.63 | 0.2 U | 0.49 J | 0.5 | 0.34 J | 0.50 U | 0.50 U | | 0.45 J | | | | |
| PW-96A | µg/L | 2 | | 7.25 | 0.28 | 0.5 U | 0.5 U | 1.43 | 0.5 U | 4.03 | 7.46 | 9.29 | 2.03 | 0.89 | 1.98 | 1.84 | 5.58 | 0.50 U | | | 2.98 | 4.37 |
| PW-97A | µg/L | 2 | | 0.93 | 0.5 U | 0.5 U | 0.5 U | 0.6 | 0.5 U | 0.29 J | 0.2 U | 0.62 | 0.38 J | 0.19 J | 0.25 J | 0.50 U | 0.23 J | 0.50 U | | | | |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | | | |
| E-11 | µg/L | 2 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.46 J | 0.50 U | 0.50 U | 0.50 U | 0.16 J | 0.530 | 0.730 | 0.440 | 0.760 |
| EI-5 | µg/L | 2 | | | | | | | | | | | | | | 8 [3] | 106 | 127 | 93.5 | 52.5 J | 26.5 | 10.0 U |
| FW-1 | µg/L | 2 | 1 U | 6 | 6 | 3 | 3 | 0.89 | 1.54 | 2.59 | 1.32 | 1.08 | 0.91 | 2.3 | 11 | 6.12 | 5.39 | 4.1 U | | 6.03 | | 0.770 |
| FW-2 | µg/L | 2 | 4.8 | 2.89 | 2.66 | 2.49 | 1.55 | 0.65 | 0.89 | 1.85 | 1.36 | 1.32 | 1.18 | 3.11 | 0.5 U | 0.27 J | 0.50 U | 0.50 U | 0.400 U | 0.400 U | | 0.270 J |
| FW-3 | µg/L | 2 | 50 U | 3.12 | 2.77 | 0.5 | 0.5 J | 0.5 U | 0.5 U | 0.5 U | 0.56 | 0.74 U | 0.59 | 3.45 | 3.6 | 3.19 | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 7.50 | 0.400 U |
| FW-4 | µg/L | 2 | | 0.33 J | 0.21 J | 0.49 J | 0.5 J | 2.11 | 0.5 U | 1.01 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.39 J | 0.50 U | 0.50 U | 0.21 J | 0.800 U | 0.387 J | 0.290 J | 0.299 J |
| FW-5 | µg/L | 2 | | | | | | | | | | | | | 0.50 U | | | | | | | 1.33 |
| FW-6 | µg/L | 2 | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 | 0.400 U | 0.400 U |
| FW-7 | µg/L | 2 | | 2.1 | 0.89 | 0.61 | 0.46 J | 0.49 J | 0.41 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 6.0 | 0.16 J | 3.89 | 0.50 U | 8.03 | 10.6 | 4.74 | 2.43 |
| I-2 | µg/L | 2 | | | | | | | | | | | | | | 226 [3] | 334 | 474 | 543 | 682 | 560 | 724 |
| I-3 | µg/L | 2 | | | | | | | | | | | | | | 0.5 U [3] | 200 | 1.0 | 173 | 10.7 | 156 | 0.381 J |
| MW-01A | µg/L | 2 | 36.3 | 0.99 | 0.82 | 0.62 | 0.61 | 2.89 | 1.47 | 1.36 | 13.4 | 10.5 | 5.3 | 13.6 | 8.6 | 7.78 | 5.94 | 9.28 | 12.2 | 21.2 | 9.72 | 13.4 |
| MW-02A | µg/L | 2 | 166 | 52.7 | 36.5 | 42.1 | 16.4 | 49.2 | 21.4 | 19.6 | 53.6 | 46.8 | 0.5 U | 47.5 | 42.3 | 17.7 | 21.5 | 28.8 | 35.8 | 24.3 | 26.6 | 27.1 |
| MW-03A | µg/L | 2 | 1.1 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 25.8 | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.45 J | 0.400 U | 0.400 | 0.400 U | 0.555 |
| MW-04A | µg/L | 2 | 29.3 | 8.51 | 7.93 | 6.21 | 5.41 | 5.06 | 30.1 | 26.5 | 9.68 | 7.57 | 8.71 | 8.6 | 3.26 J | 3.49 | 5.52 | 3.8 | 1.69 | 4.57 | 2.87 | 5.27 |
| PW-01A | µg/L | 2 | 28.4 | 0.61 | 0.51 | 0.43 J | 0.42 J | 0.5 U | 10.9 | 13.3 | 10.4 | 8.51 | 8.21 | 6 | 5.85 | 5.21 | 0.66 | 0.50 U | 6.95 | 9.16 | 0.400 U | 0.730 |
| PW-03A | µg/L | 2 | 4.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.390 J | 0.335 J | 0.372 J | 0.283 J |
| PW-10 | µg/L | 2 | 1 U | | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 | 0.400 U | 0.400 U |
| PW-11 | µg/L | 2 | 1.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 4.75 | 4.61 | 4.19 | 19.4 | 2.54 J | 0.5 U | 1.66 | 3.93 | 0.50 U | 0.34 J | 0.48 J | 0.400 U | 0.21 J | 0.400 U | 0.400 U |
| PW-12 | µg/L | 2 | 29 | 10.1 | 8.1 | 4.3 | 6.3 | 25.7 | 390 | 377 | 21.5 | 25.4 | 24.3 J | 36.1 | 22.6 | 15.3 | 3.79 | 3.52 | 14.6 | 11.8 | 2.36 | 3.35 |
| PW-13 | µg/L | 2 | 11.1 | 2.43 J | 2.13 J | 2.5 U | 1.11 J | 2.23 | 2.15 | 1.98 | 0.5 U | 25 U | 25 U | 5 U | 1.53 | 0.59 | 0.93 | 1.06 J | 20.0 U | 8.00 U | 4.40 J | 5.10 J |
| PW-14 | µg/L | 2 | 1 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-15AR | µg/L | 2 | 5 U | | | | | | | | | | | | 0.50 U | | | | | | | |
| PW-16A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | | 0.400 U | 0.400 U |
| PW-19A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-20A | µg/L | 2 | 1 U | | | | | | | | | | | | 0.5 U | | | | | | | |
| PW-30A | µg/L | 2 | 1 U | 1.1 | 1.1 U | 1.1 U | 1.1 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 5 U | 5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 2.00 U | 2.00 U | 0.500 U | 2.00 U |
| PW-31A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5.00 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-42A | µg/L | 2 | 4.9 | 2.59 | 2.11 | 2.11 | 0.84 | 1.13 | 2.43 | 5.23 | 0.69 | 2.45 | 1.68 | 1.27 | 1.42 | 2.97 | 3.74 | 4.77 | 5.08 | 3.72 | 4.58 J | 4.85 |
| PW-45A | µg/L | 2 | 29 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 3.62 | 0.5 U | 0.9 | 10.0 | 0.50 U | 0.79 | 9.74 | 4.02 | 20.4 | 0.860 | 11.7 |

**Table 5f. VC Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-46A | µg/L | 2 | 1 U | **2.03** | 1.99 | 1.89 | 1.32 | 1.62 | 0.63 | 1.19 | 0.5 U | 0.62 | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.36 J | 0.50 U | 0.400 U | 0.400 U | 0.575 | 0.400 U |
| PW-68A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-69A | µg/L | 2 | **4** | **4.8** J | 1.06 | **3.8** J | 0.43 J | 2 U | **2.06** | 1.88 | **3.19** | 0.28 J | 1.77 J | 1.42 | 1.03 | 1 | 1.75 | **2.26** | **5.14** | 4.00 U | **2.20** | 1.39 |
| PW-70AR | µg/L | 2 | 1 U | | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | | | | | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-71A | µg/L | 2 | **3.2** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.410 | 0.400 U |
| PW-72A | µg/L | 2 | 1 U | | | | | | | | | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-73B | µg/L | 2 | **8.3** | **7.62** | **6.85** | **6.58** | **3.48** | **2.54** | **2.45** | 1.76 | **2.1** | 1.44 | 1.64 | 0.5 U | 1.65 | 1.20 | **2.08** | 1.36 | **2.46** | 1.30 | 0.725 | 1.49 |
| PW-74B | µg/L | 2 | 1 U | 0.49 J | 0.5 U | 0.5 U | 0.5 U | 0.66 | 0.5 U | 0.82 | 0.36 J | 0.31 J | 0.75 | 0.44 J | 0.34 J | 0.38 J | 0.51 | 0.35 J | 0.529 | 0.420 | 0.358 J | 0.340 J |
| PW-75A | µg/L | 2 | 1.8 | 0.5 U | 0.12 J | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-76A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-77A | µg/L | 2 | 50 U | **3.15** | **2.86** | 1.89 | 1.13 | 0.41 J | 0.72 | 0.69 | 1.26 | 0.5 U | 0.37 J | 0.2 J | 0.60 | 0.50 U | 0.50 U | 0.50 U | 0.400 U | **3.66** | 0.400 U | 0.380 J |
| PW-78A | µg/L | 2 | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 J | 0.5 U | 0.26 J | 0.28 J | 0.22 J | 0.20 J | 0.25 J | 0.253 J | 0.230 J | 0.400 U | 0.400 U |
| PW-79A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-80A | µg/L | 2 | 1.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.77 | 1.9 | 0.83 | 0.71 | **2.35** | 1.21 | **2.05** | 0.400 U |
| PW-81A | µg/L | 2 | 1 U | | | | | | | | | | | | 0.41 J | | | | | | | 0.370 J |
| PW-82A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-83A | µg/L | 2 | **4.7** | 0.67 | 0.43 J | 0.33 J | 0.11 J | 0.5 U | **2.34** | 0.88 | 0.83 | 1.14 | 0.77 | 0.43 J | 0.53 | 0.50 U | 0.26 J | 0.46 J | 0.430 | 0.510 | 0.433 | 0.420 |
| PW-84AR | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.260 J | 0.200 J | 0.310 J |
| PW-85A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | | 0.400 U | 0.300 J | 0.200 J | 0.240 J |
| PW-86A | µg/L | 2 | **45.8** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | **3.21** | 0.5 U | 0.50 U | 0.94 | **2.5** | | **6.88** | **5.49** | **4.80** | **5.36** |
| PW-87A | µg/L | 2 | 1 U | 1.12 | 0.98 | 0.89 | 0.34 J | 0.55 | 0.5 U | 0.68 | 0.28 J | 0.5 U | 0.29 J | 0.29 J | 0.31 J | 0.37 J | 0.27 J | 0.16 J | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-88A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.26 J | 0.400 U | 0.400 U | 0.200 J | 0.400 U |
| PW-89A | µg/L | 2 | 1.2 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.331 J | 0.375 J |
| PW-91A | µg/L | 2 | **3** | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.22 J | 0.400 U | 0.470 | 0.400 U | 0.400 U |
| PW-92A | µg/L | 2 | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-93A | µg/L | 2 | | **14** J | **10** | 25 U | 10 U | **88.4** | **41.4** | **38.3** | **7.43** | **5.07** | **2.49** | **4.1** | **2.51** | **2.52** | **3.45** | **5.51** | **2.88** | **16.8** | **3.70** | **15.4** |
| PW-94A | µg/L | 2 | | 1.7 | 1.39 | 0.68 | 0.81 | 0.67 | 0.76 | 0.71 | **2.24** | 25 U | 25 U | **2.23** J | 1.93 J | **2.54** J | **11.4** | **4.91** | **11.6** | **4.78** | **4.60** | **24.8** |
| PW-95A | µg/L | 2 | | **3.8** | 0.24 J | **2.1** | 0.5 U | | 0.84 | 0.76 | **3.16** | 1.43 | 25 U | 1.04 | 1.41 | 0.95 | 0.76 | 0.38 J | 0.235 J | **2.62** | 0.900 J | **6.10** |
| PW-98A | µg/L | 2 | | | **78.2** | **25.3** | **34.4** | 0.23 J | 0.6 | 0.54 | **2.56** | 5 U | 5 U | **13** | **52.1** | **64** | **109** | **114** | **110** | **196** | **93.6** | **99.5** |
| PW-99A | µg/L | 2 | | **4.23** | **5.33** | **2.48** | **2.84** | **12.3** | **11.1** | **9.82** | 0.45 J | **5.63** | **10.9** | 0.42 J | 0.72 | 1.78 | **2.11** | **2.93** | **2.02** | **2.40** J | 1.60 J | 0.600 J |
| PW-100A | µg/L | 2 | | **5.18** | **19.9** | **16.8** | **7.64** | **6.44** | 1.05 | 1.04 | **2.03** | **4.12** | 0.97 | 0.67 | **14.2** | **4.43** | **14** | **21.2** | **37.0** | **30.5** | **23.8** | **4.40** |
| PW-101A | µg/L | 2 | | 0.5 U | **36.5** | **31.2** | **26.4** | 0.2 U | 1.05 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.50 U | 0.50 U | 0.26 J | 0.52 J | 1.83 | 0.400 U | **4.30** | 0.810 |

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

[3] Initial samples were collected in fall 2016 for EI-5, I-2, and I-3.

10-year rolling table. Refer to past annual reports for a full records of historical concentrations.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

µg/L = micrograms per liter

E = estimated value above the calibration range

J = estimated value

U = not detected above reporting limit

VC = vinyl chloride

**Table 5g. Ammonium Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | | | | |
| EW-1 | mg/L | 250 | 316 | 34 | 20 | 19 | 16 | 41.7 | 57 | 39.7 | 60.3 | 51.8 | 51.4 | 52.6 | 62.5 | 63.5 | 75.1 | 42.0 | 54.3 | 61.5 | 54.1 | 77.1 |
| EW-2 | mg/L | 250 | 410 | 60 | 40 | 53 | 25 | 42.7 | 75.2 | 49 | | | 66.7 | 58.7 | 69.9 | 84.3 | 64.1 | 70.1 | 49.0 | 50.3 | 50.9 | 61.8 |
| EW-3 | mg/L | 250 | 87.6 | 24 | 24 | 23 | 22 | 29.6 | 42.1 | 30.1 | 36.3 | 28.6 | 31 | 44.7 | 33.4 | 46.8 | 26.6 | 34.4 | 38.3 | 32.8 | 36.1 | 34.1 |
| PW-21A | mg/L | 250 | | 33 | 28 | 31 | 18 | 30.9 | 69.2 | 20 | 45.7 | 14.6 | 70.7 | | 13.8 | 57.1 | 26.1 | 98.3 | 56.1 | 114 | 27.5 | 126 |
| PW-22A | mg/L | 250 | 252 | 255 | 234 | 265 | 236 | 73.2 | 127 | 134 | 77.4 | 68.6 | 160 | 157 | 145 | 59.2 | 123 | 108 | 117 | 107 | 120 | 118 |
| PW-23A | mg/L | 250 | 81.5 | 42 | 36 | 35 | 29 | 64.8 | 51.6 | 39.2 | 43.6 | 39.4 | 38.6 | 37.9 | 41.6 | 38.3 | 38.3 | 39.0 | 52.8 | 38.4 | 35.9 | 36.0 |
| PW-24A | mg/L | 250 | 265 | 180 | 156 | 165 | 148 | 81.2 | 40.7 | 61.9 | 77.4 | 122 | 60.5 | 96.1 | 187.5 | 84.1 | 52.6 | 161 | 158 | 184 | 120 | 164 |
| PW-27A | mg/L | 250 | | 22 | 18 | 20 | 18 | 11.9 | | 15.7 | 20.2 | 26.6 | 7.58 | 9.11 | 22.5 | 25.5 | 18.3 | 18.6 | 19.5 | 10.7 | 15.8 | 12.2 |
| PW-28A | mg/L | 250 | 450 | 190 | 157 | 167 | 145 | 324 | 352 | 259 | 173 | 170 | 262 | 234 | 145 | 210 | 221 | 139 | 173 | 6.01 | 117 | 139 |
| PW-50A | mg/L | 250 | 161 | 0.33 | 0.18 | 0.33 | 0.14 | 32.1 | 11.1 | 19.9 | 12.4 | 26.3 | 3.77 | 19 | 44.4 | 26 | 7.24 | 13.2 | 10.1 | 63.3 | 11.8 | 55.1 |
| PW-51A | mg/L | 250 | 195 | 55 | 44 | 48 | 28 | 73.2 | 95.2 | 69.5 | 107 | 106 | 88.4 | 101 | 157.5 | 141 | 125 | 102 | 119 | 109 | 148 | 126 |
| PW-52A | mg/L | 250 | 367 | 185 | 175 | 131 | 175 | 101 | | 92.6 | 184 | 140 | 128 | 122 | 145 | 149 | 140 | 112 | 114 | 178 | 122 | 183 |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | | | |
| E-11 | mg/L | 250 | | | | | | | | | | | | | 0.25 | | | | | | | |
| EI-5 | mg/L | 250 | | | | | | | | | | | | | | | | | | | | |
| FW-1 | mg/L | 250 | 0.2 | | | | | | | | | | | | 0.063 UJ | | | | | | | |
| FW-2 | mg/L | 250 | | | | | | | | | | | | | 0.093 U | | | | | | | |
| FW-3 | mg/L | 250 | | | | | | | | | | | | | 0.038 J | | | | | | | |
| FW-4 | mg/L | 250 | | | | | | | | | | | | | 0.063 U | | | | | | | |
| FW-5 | mg/L | 250 | | 1,065 | 940 | | | 265 | 129 | 236 | 190 | 156 | 256 | 1585 | 1,001 | 434 | 294 | 358 | 308.8 | 215 | 203.8 | 196.3 |
| FW-6 | mg/L | 250 | | | | | | | | | | | | | 0.063 U | | | | | | | |
| FW-7 | mg/L | 250 | | | | | | | | | | | | | 0.12 | | | | | | | |
| I-2 | mg/L | 250 | | | | | | | | | | | | | | | | | | | | |
| I-3 | mg/L | 250 | | | | | | | | | | | | | | | | | | | | |
| MW-01A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| MW-02A | mg/L | 250 | 0.25 U | | | | | | | | | | | | 0.049 J | | | | | | | |
| MW-03A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.079 J | | | | | | | |
| MW-04A | mg/L | 250 | 0.175 | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-01A | mg/L | 250 | 4,413 | 100 | 81.3 | 68.8 | 75.0 | 56.3 | 139 | 129 | 120 | 735 | 229 | 224 | 176 | 189 | 2,400 | 1,400 | 723 | 189 | 1,205 | 1,350 |
| PW-03A | mg/L | 250 | 274 | 52.5 | 35 | 35 | 28.8 | 18.8 | 71.1 | 63.6 | 80.0 | 86.4 | 70.0 | 69.9 | 67.0 | 59.6 | 116 | 188 | 166 | 204 | 235 | 218 |
| PW-10 | mg/L | 250 | 1.75 | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-11 | mg/L | 250 | 7.5 | | | | | | | | | | | | 4.85 | | | | | | | |
| PW-12 | mg/L | 250 | 2 | | | | | | | | | | | | 0.325 | | | | | | | |
| PW-13 | mg/L | 250 | 8.75 | | | | | | | | | | | | 2.93 | | | | | | | |
| PW-14 | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-15AR | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.030 J | | | | | | | |
| PW-16A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-19A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-20A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-30A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.064 | | | | | | | |
| PW-31A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-42A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.121 | | | | | | | |
| PW-45A | mg/L | 250 | 0.25 | | | | | | | | | | | | 0.175 | | | | | | | |

**Table 5g. Ammonium Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-46A | mg/L | 250 | 0.375 | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-68A | mg/L | 250 | 0.375 | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-69A | mg/L | 250 | 0.75 | | | | | | | | | | | | 1.11 | | | | | | | |
| PW-70AR | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-71A | mg/L | 250 | 0.375 | | | | | | | | | | | | 0.675 | | | | | | | |
| PW-72A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-73B | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-74B | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.188 | | | | | | | |
| PW-75A | mg/L | 250 | 0.625 | | | | | | | | | | | | 0.03 J | | | | | | | |
| PW-76A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-77A | mg/L | 250 | 0.463 | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-78A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-79A | mg/L | 250 | 0.25 | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-80A | mg/L | 250 | 2.68 | | | | | | | | | | | | 0.575 | | | | | | | |
| PW-81A | mg/L | 250 | 0.125 U | | | | | | | | | | | | 0.119 | | | | | | | |
| PW-82A | mg/L | 250 | 81.5 | | | | | | | | | | | | 25.4 | | | | | | | |
| PW-83A | mg/L | 250 | 42.63 | 26.3 | 22.5 | 17.5 | 15.0 | 10.0 | 18.5 | 25.3 | 19.5 | 11.5 | 14.1 | | 21.3 | 14.0 | 28.1 | 33.8 | 33.0 | 35.8 | 50.0 | 41.3 |
| PW-84AR | mg/L | 250 | 0.175 | 0.5 U | 0.625 U | 0.625 U | 0.625 U | 0.625 U | 0.125 U | 0.125 U | 0.018 U | 0.041 J | 0.063 U | 0.027 J | 0.093 U | 0.063 U | 0.048 J | 0.15 | 0.02 U | 0.02 U | 0.025 U | 0.099 |
| PW-85A | mg/L | 250 | 0.438 | | | | | | | | | | | 18.3 | 0.063 U | | | | | | | |
| PW-86A | mg/L | 250 | 0.875 | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-87A | mg/L | 250 | 0.588 | | | | | | | | | | | | 1.08 | | | | | | | |
| PW-88A | mg/L | 250 | 6.53 | | | | | | | | | | | | 3.64 | | | | | | | |
| PW-89A | mg/L | 250 | 107 | 22.5 | 20.0 | 17.5 | 15.0 | 12.5 | 11.3 | 10.2 | 48.0 | 78.1 | 40.0 | 31.5 | 0.093 | 25.3 | 16.9 | 8.9 | 40.8 | 18.8 | 10.8 | 4.4 |
| PW-91A | mg/L | 250 | 1.13 | | | | | | | | | | | | 0.838 | | | | | | | |
| PW-92A | mg/L | 250 | 8.78 | 5 | 5 | 5 | 5 | 6.25 U | 5.08 | 4.44 | 3.96 | 5.01 | 4.24 | 4.49 | 4.31 | 4.39 | 4.73 | 2.38 | 3.85 | 3.45 | 3.53 | 4.81 |
| PW-93A | mg/L | 250 | | | | | | | | | | | | | 0.675 | | | | | | | |
| PW-94A | mg/L | 250 | | | | | | | | | | | | | 1.15 | | | | | | | |
| PW-95A | mg/L | 250 | | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-98A | mg/L | 250 | | | | | | | | | | | | | 0.041 J | | | | | | | |
| PW-99A | mg/L | 250 | | | | | | | | | | | | | 0.063 U | | | | | | | |
| PW-100A | mg/L | 250 | | | | | | | | | | | | | 0.263 | | | | | | | |
| PW-101A | mg/L | 250 | | | | | | | | | | | | | 0.238 | | | | | | | |

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

10-year rolling table. Refer to past annual reports for a full records of historical concentrations.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

E = estimated value above the calibration range

J = estimated value

mg/L = milligrams per liter

U = not detected above reporting limit

**Table 5h. Fluoride Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | | | | |
| EW-1 | mg/L | 4 | 40.8 | 1.1 | 1 | 1.2 | 1.2 | 12.9 | 11.7 | 13.5 | 8.16 | 10 | 2.99 | 3.28 | 9.76 J | 13.3 | 12.4 J | 9.94 | 1.0 U | 11.2 | 9.01 | 15.2 |
| EW-2 | mg/L | 4 | 12.7 | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.52 | 1.99 | 3.98 | | | 0.199 J | 0.431 J | 4.54 J | 6.34 | 3.62 J | 2.99 | 1.0 U | 1.98 | 1.0 U | 10 U |
| EW-3 | mg/L | 4 | 31.3 | 4.2 | 3.8 | 3.8 | 3.3 | 13.4 | 9.85 | 5.41 | 8.43 | 5.89 | 5.35 | 6.66 | 3.99 J | 23.1 | 3.68 J | 11.4 | 6.16 | 15.2 | 16.4 | 13.3 |
| PW-21A | mg/L | 4 | | 1.1 | 1 | 1.1 | 1.1 | 6.66 | 1.21 | 0.46 | 1.28 | 0.448 J | 1.78 | | 0.46 J | 1.82 | 0.52 J | 2.16 | 1.54 | 2.66 | 1.0 U | 2.79 |
| PW-22A | mg/L | 4 | 10 U | 2.6 | 2.5 | 2.4 | 2.4 | 3.18 | 2.25 | 2.23 | 1.21 | 1.91 | 3.53 | 2.97 | 2.59 | 2.71 | 2.94 | 2.01 | 3.32 | 3.0 | 3.53 | 5.02 |
| PW-23A | mg/L | 4 | 13.6 | 14 | 12 | 12 | 11 | 19.5 | 22.3 | 15.3 | 16.8 | 17.1 | 24.4 | 26.1 | 22.8 | 23.4 | 23.6 | 25 | 23 | 25.2 J | 24.7 | 27 |
| PW-24A | mg/L | 4 | 4.6 | 1 U | 1 U | 1 U | 1 U | 0.56 | 0.69 | 0.84 | 0.707 | 0.693 J | 0.605 J | 0.66 J | 0.79 J | 0.727 J | 0.84 J | 0.51 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| PW-27A | mg/L | 4 | | 1 U | 1 U | 1 U | 1 U | 0.1 | 0.11 | 0.023 J | 0.01 J | 1 U | 0.044 J | 0.056 U | 0.43 J | 0.093 J | 0.11 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| PW-28A | mg/L | 4 | 12.9 | 1 U | 1 U | 1 U | 1 U | 24.6 | 6.84 | 0.79 | 19.6 | 7.61 | 0.118 J | 0.158 J | 2.89 | 3.41 | 4.13 J | 10.4 | 100 U | 1.05 | 1.0 U | 1.0 U |
| PW-50A | mg/L | 4 | 12.4 | 1 U | 1 U | 1 U | 1 U | 2.63 | 1.29 | 2.43 | 1.02 | 2.69 | 0.775 J | 1.31 | 2.48 J | 1.8 | 1.57 J | 1.26 | 1.08 | 6.03 | 1.0 | 6.08 |
| PW-51A | mg/L | 4 | 148 | 1.4 | 1.2 | 1.2 | 1.1 | 3.66 | 4.99 | 2.69 | 0.404 | 0.286 J | 0.413 J | 0.752 J | 1.09 J | 1.19 | 1.26 J | 1.08 | 1.0 | 1.0 | 1.14 | 5.0 U |
| PW-52A | mg/L | 4 | 30.2 | 0.18 | 0.16 | 0.16 | 0.15 | 9.5 | 2.9 | 8.74 | 13.7 | 15.9 | 3.34 | 1.73 | 9 J | 11.5 | 11.9 J | 9.84 | 17.8 | 1.0 U | 1.0 U | 20.8 |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | | | |
| E-11 | mg/L | 4 | | 10 | 9 | 9 | 8 | 7.8 | 3.1 | 2.9 | 3.07 | 2.96 | 5.25 | 5.09 | 5.94 | 6.84 | 6.41 | 6.19 | 4.86 | 5.33 | 4.46 | 5.54 |
| EI-5 | mg/L | 4 | | | | | | | | | | | | | | 17.5 [3] | 26.1 | 20.9 | 19.1 | 20.5 | 9.03 | 16.1 |
| FW-1 | mg/L | 4 | 2.47 | | | | | | | | | | | | 1.32 | | | | | | | |
| FW-2 | mg/L | 4 | 0.8 | | | | | | | | | | | | 0.88 J | | | | | | | |
| FW-3 | mg/L | 4 | 1.86 | 2 | 2 | 1.51 | 1.5 | 1.51 | 1.44 | 1.77 | 1.44 | 1.49 | 1.22 | 1.23 | 2.12 | 2.11 | 2.07 | 2.16 | 5.7 | 2.9 J | 2.11 | 2.25 |
| FW-4 | mg/L | 4 | | | | | | | | | | | | | 0.19 J | | | | | | | |
| FW-5 | mg/L | 4 | | | | 16.1 | | | | | | | | | 16.6 | | | | | 23.2 | | 24.3 |
| FW-6 | mg/L | 4 | | 2 | 1.8 | 1.8 | 1.5 | 1.5 | 1.2 | 1.1 | 7.34 | 4.3 | 8.47 | 42.8 | 9.8 | 11.7 | 6.23 | 8.96 | 9.45 | 7.06 | 8.79 | 8.73 |
| FW-7 | mg/L | 4 | | | | 0.15 | | | | | | | | | 0.12 | | | | | | | |
| I-2 | mg/L | 4 | | | | | | | | | | | | | | 9.33 [3] | 10.9 | 13.3 | 8.67 | 24.4 | 13.2 | 14.9 |
| I-3 | mg/L | 4 | | | | | | | | | | | | | | 4.4 [3] | 2.57 J | 2.94 | 2.22 | 2.81 | 5.45 | 1.04 |
| MW-01A | mg/L | 4 | 0.12 | | | | | | | | | | | | 0.12 J | | | | | | | |
| MW-02A | mg/L | 4 | 0.17 | | | | | | | | | | | | 0.43 J | | | | | | | |
| MW-03A | mg/L | 4 | 0.16 | | | | | | | | | | | | 0.18 J | | | | | | | |
| MW-04A | mg/L | 4 | 0.18 | | | | | | | | | | | | 0.18 J | | | | | | | |
| PW-01A | mg/L | 4 | 20 U | | | | | | | | | | | | 0.78 U | | | | | | | |
| PW-03A | mg/L | 4 | 1.44 | | | | | | | | | | | | 1.2 | | | | | | | |
| PW-10 | mg/L | 4 | 50 | 20 | 18 | 15 | 14 | 9 | 12 | 11.3 | 26.2 | 20.1 | 25.8 | 42.1 | 26.7 | 19.2 | 22.8 | 21 | 20.1 | 22 | 22.9 J | 20.7 J |
| PW-11 | mg/L | 4 | 2.44 | 2 U | 2 U | 2 U | 2 U | 1 U | 1 U | 1 U | 1.73 | 1.43 | 2.99 | 2.51 | 2.4 | 2.68 | 2.54 | 2.18 | 2.3 | 2.32 | 2.07 | 2.06 |
| PW-12 | mg/L | 4 | 0.7 | 1 U | 1 U | 1 U | 1 U | 1 U | 9.65 | 9.56 | 2.27 | 1.77 | 2.8 | 2.97 | 3.04 | 3.13 | 2.45 | 2.45 | 2.33 | 2.96 | 1.53 | 2.06 |
| PW-13 | mg/L | 4 | 43.2 | 27 | 24 | 16 | 21 | 19 | 17 | 14 | 28.7 | 27.6 | 25.9 | 31.2 | 17.7 | 17.6 | 16.8 | 17 | 39 | 28.1 | 31.3 | 26 |
| PW-14 | mg/L | 4 | 2.06 | | | | | | | | | | | | 0.86 J | | | | | | | |
| PW-15AR | mg/L | 4 | 0.1 U | | | | | | | | | | | | 0.32 J | | | | | | | |
| PW-16A | mg/L | 4 | 0.1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 0.01 U | 0.213 J | 0.066 J | 0.081 J | 0.24 J | 0.099 U | 0.073 J | 0.061 J | 1.0 U | | 1.0 U | 1.0 U |
| PW-19A | mg/L | 4 | 0.1 | | | | | | | | 0.443 | 0.539 J | 0.119 J | 0.146 J | 0.28 J | 0.205 U | 1.21 | 0.057 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| PW-20A | mg/L | 4 | 0.27 | | | | | | | | | | | | 0.29 J | | | | | | | |
| PW-30A | mg/L | 4 | 0.38 | | | | | | | | | | | | 0.27 J | | | | | | | |
| PW-31A | mg/L | 4 | 0.13 | | | | | | | | | | | | 0.046 J | | | | | | | |
| PW-42A | mg/L | 4 | 0.16 | | | | | | | | | | | | 0.13 J | | | | | | | |
| PW-45A | mg/L | 4 | 0.1 U | | | | | | | | | | | | 0.094 J | | | | | | | |

**Table 5h. Fluoride Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-46A | mg/L | 4 | 0.29 | | | | | | | | | | | | 0.19 J | | | | | | | |
| PW-68A | mg/L | 4 | 0.15 | | | | | | | | | | | | 0.19 J | | | | | | | |
| PW-69A | mg/L | 4 | 11 | | | | | | 1.39 | | 6.14 | | | | 8.89 | | | | | 10.2 | 9.98 | 12.9 |
| PW-70AR | mg/L | 4 | 0.1 U | | | | | | | | | | | | 0.093 J | | | | | | | |
| PW-71A | mg/L | 4 | 1.1 | | | | | | | | | | | | 1.8 | | | | | | | |
| PW-72A | mg/L | 4 | 5.62 | | | | | | | | | | | | 2.64 | | | | | | | |
| PW-73B | mg/L | 4 | 0.15 | | | | | | | | | | | | 0.32 J | | | | | | | |
| PW-74B | mg/L | 4 | 0.17 | | | | | | | | | | | | 0.29 J | | | | | | | |
| PW-75A | mg/L | 4 | 0.8 | | | | | | | | | | | | 1.12 | | | | | | | |
| PW-76A | mg/L | 4 | 0.35 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 0.524 | 0.374 J | 0.286 J | 0.357 J | 0.47 J | 0.324 U | 0.67 J | 0.25 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| PW-77A | mg/L | 4 | 0.64 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 0.686 | 0.464 J | 0.287 J | 0.311 J | 0.45 J | 0.426 U | 0.35 J | 0.26 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| PW-78A | mg/L | 4 | 0.19 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 0.494 | 0.288 J | 0.273 J | 0.33 J | 0.45 U | 0.678 J | 0.37 J | 0.27 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| PW-79A | mg/L | 4 | 0.96 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 0.01 U | 0.236 J | 0.127 J | 0.153 J | 0.29 J | 0.166 U | 1.06 | 0.077 J | 1.15 | 2.0 | 1.7 | 2.0 |
| PW-80A | mg/L | 4 | 0.17 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 0.486 | 0.273 J | 0.143 J | 0.186 J | 0.35 J | 0.561 J | 0.28 J | 0.13 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| PW-81A | mg/L | 4 | 0.1 U | | | | | | | | | | | | 0.065 J | | | | | | | |
| PW-82A | mg/L | 4 | 0.42 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 0.648 | 0.51 J | 0.429 J | 0.678 J | 0.982 J | 0.626 J | 0.65 J | 0.62 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| PW-83A | mg/L | 4 | 0.16 | | | | | | | | | | | | 0.622 J | | | | | | | |
| PW-84AR | mg/L | 4 | 0.83 | | | | | | | | | | | | 0.64 J | | | | | | | |
| PW-85A | mg/L | 4 | 1 | | | | | | | | | | | | 0.65 J | | | | | | | |
| PW-86A | mg/L | 4 | 0.1 U | | | | | | | | | | | | 1.4 | | | | | | | |
| PW-87A | mg/L | 4 | 0.27 | | | | | | | | | | | | 0.32 J | | | | | | | |
| PW-88A | mg/L | 4 | 0.4 | | | | | | | | | | | | 0.55 J | | | | | | | |
| PW-89A | mg/L | 4 | 17 | 8.2 | 7.5 | 7.8 | 6.4 | 5.5 | 5.5 | 9.87 | 9 | 9.9 | 13.5 | 14.5 | 13.6 | 11.2 | 17.2 | 16.1 | 17 | 18.2 | 17.3 | 15.6 |
| PW-91A | mg/L | 4 | 0.6 | | | | | | | | | | | | 1.15 | | | | | | | |
| PW-92A | mg/L | 4 | 0.23 | | | | | | | | | | | | 0.54 J | | | | | | | |
| PW-93A | mg/L | 4 | | | | | | | 9.85 | | 1.97 | | | | 3.99 | | | | 3.56 | 2.78 J | | 1.54 |
| PW-94A | mg/L | 4 | | | | | | | 9.75 | | | | | | 7.04 | | | | 7.1 | 6.26 | | 9.84 |
| PW-95A | mg/L | 4 | | | | | | | 7.33 | | | | | | 9.84 | | | | | 4.52 J | | 10.1 |
| PW-98A | mg/L | 4 | | | | | | 11.1 | 10.2 | | 9.11 | 9.87 | 8.84 | 13.7 | 16.8 | 17.4 | 15.9 | 17.6 | 14.9 | 65 J | 14.8 | 15.2 |
| PW-99A | mg/L | 4 | | 9.8 | 7.3 | 9.4 | 3.4 | 15 | 13 | 12 | 9.69 | 9.86 | 12.8 | 12.8 | 12.9 | 9.56 | 10 | 10.1 | 9.58 | 11.3 | 12.2 | 11.3 |
| PW-100A | mg/L | 4 | | | | | | | 11.7 | 10.3 | | | | | 0.11 U | | | | | 1.0 U | | 1.0 U |
| PW-101A | mg/L | 4 | | | | | | | 1.57 | 1.46 | | | | | 1.88 | | | | | | | |
| Solids Area | | | | | | | | | | | | | | | | | | | | | | |
| PW-07 | mg/L | 4 | | | 1 U | | 1 U | | 1 U | | 1 U | | 0.163 J | | 0.173 J | | 0.12 | | 1.0 U | | 1.0 U | |
| PW-09 | mg/L | 4 | 2.65 | | 1 U | | 1 U | | 1 U | | 1 U | | | | 1.69 | | 1.87 | | | | | |
| PW-17B | mg/L | 4 | 2.5 | | 1 U | | 1 U | | 1 U | | 1 U | | 0.472 J | | 1.06 | | 0.62 | | 1.3 | | 1.0 U | |
| PW-18B | mg/L | 4 | 4.49 | | 2 | | 1.8 | | 1.4 | | 1.36 | | 0.458 J | | 1.96 | | 1.89 | | 1.89 | | 1.75 | |
| PWA-1 | mg/L | 4 | 3.67 | | | | | | | | | | | | 0.22 J | | | | | | | |
| PWA-2 | mg/L | 4 | | | | | | | | | | | | | 1 U | | | | | | | |
| PWB-1 | mg/L | 4 | 3.73 | | 2 | | 2 | | 2 | | 1.89 | | 1.33 | | 1.36 | | 1.08 | | 1.11 | | 1.33 | |
| PWB-2 | mg/L | 4 | 3.81 | | 1 U | | 1 U | | 1 U | | 1 U | | 1.22 | | 1.48 | | 1.8 | | 1.15 | | 1.24 | |
| PWB-3 | mg/L | 4 | 10 U | | 2 | | 1.7 | | 1.5 | | 1.48 | | 1.79 | | 10.4 | | 5.15 | | 2.08 | | 10 U | |
| PWC-1 | mg/L | 4 | | | | | | | | | | | | | 0.34 J | | | | | | | |
| PWC-2 | mg/L | 4 | | | | | | | | | | | | | 0.29 J | | | | | | | |

**Table 5h. Fluoride Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PWD-1 | mg/L | 4 | | | | | | | | | | | | | 0.063 J | | | | | | | |
| PWD-2 | mg/L | 4 | | | | | | | | | | | | | 0.135 J | | | | | | | |
| PWE-1 | mg/L | 4 | **4.6** | | 2.7 | | 2.1 | | 2 | | 1.93 | | | | 2.67 | | 2.67 | | 2.06 | | 2.57 | |
| PWE-2 | mg/L | 4 | 0.2 U | | 1 U | | 1 U | | 1 U | | 1 U | | | | 0.053 J | | 0.017 | | 1.0 U | | 1.0 U | |
| PWF-1 | mg/L | 4 | | | | | | | | | | | | | 0.274 J | | | | | | | |
| PWF-2 | mg/L | 4 | | | | | | | | | | | | | 0.122 J | | | | | | | |

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

[3] Initial samples were collected in fall 2016 for EI-5, I-2, and I-3.

Solids Area sampled annually in August.

10-year rolling table. Refer to past annual reports for a full records of historical concentrations.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

E = estimated value above the calibration range

J = estimated value

mg/L = milligrams per liter

U = not detected above reporting limit

**Table 5i.  Nitrate Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | | | | |
| PW-21A | mg/L | 10 | | | | | | | | | | | | | 15.8 J | | | | | 107 | | 98.8 |
| PW-24A | mg/L | 10 | 11.1 | | | | | | | | | | | | 16.6 J | | | | | 14.2 | | |
| PW-27A | mg/L | 10 | | | | | | | | | | | | | 42.2 J | | | | | 27.9 | | |
| PW-51A | mg/L | 10 | 4.7 J | | | | | | | | | | | | 107 J | | | | | 74.0 | | |
| PW-52A | mg/L | 10 | 1.5 J | | | | | | | | | | | | 21.0 J | | | | | 0.250 U | | |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | | | |
| E-11 | mg/L | 10 | | 5 U | 5 U | 5 U | 5 U | 0.24 | 0.21 | 2.6 | 16.7 | 0.1 U | 0.031 J | 0.004 J | 0.085 J | 2.17 | 0.33 | 0.10 U | 6.93 | 0.250 U | 14.1 | 0.250 U |
| EI-5 | mg/L | 10 | | | | | | | | | | | | | | 0.069 J[3] | 0.1 U | 0.12 | 0.250 U | 0.250 U | 0.250 U | 0.250 U |
| FW-1 | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.09 U | | | | | | | |
| FW-2 | mg/L | 10 | 1.32 | | | | | | | | | | | | 3.45 | | | | | | | |
| FW-3 | mg/L | 10 | 36.3 | 5.5 | 5.8 | 4.8 | 4.8 | 4.2 | 3.9 | 3.6 | 3.9 | 3.5 | 3.1 | 2.13 | 1.47 | 1.49 | 0.81 | 0.71 | 0.724 | 0.53 | 0.961 | 0.965 |
| FW-4 | mg/L | 10 | | | | | | | | | | | | | 0.69 | | | | | | | |
| FW-5 | mg/L | 10 | | | | | | | | | | | | | 62.2 | | | | | 14.7 | | 11.8 |
| FW-6 | mg/L | 10 | | 5 U | 5 U | 5 U | 5 U | 1.81 | 5 U | 5 U | 1.83 | 1.48 | 1.59 | 0.895 J | 1.31 | 1.16 | 0.12 | 0.58 | 0.250 U | 0.250 U | 0.250 U | 0.250 U |
| FW-7 | mg/L | 10 | | | | | | | | | | | | | 0.044 J | | | | | | | |
| I-2 | mg/L | 10 | | | | | | | | | | | | | | 0.1 U[3] | 0.1 U | 0.11 | 0.250 U | 13.5 | 0.250 U | 0.250 U |
| I-3 | mg/L | 10 | | | | | | | | | | | | | | 16.5 [3] | 0.17 J | 1.88 | 1.86 | 34.3 | 16.7 | 3.35 |
| MW-01A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.26 | | | | | | | |
| MW-02A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.09 J | | | | | | | |
| MW-03A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.1 U | | | | | | | |
| MW-04A | mg/L | 10 | 1.22 | | | | | | | | | | | | 0.1 U | | | | | | | |
| PW-01A | mg/L | 10 | 20 U | | | | | | | | | | | | 1.03 U | | | | | | | |
| PW-03A | mg/L | 10 | 13.1 | | | | | | | | | | | | 19.9 | | | | | 17.5 | | 71.5 |
| PW-10 | mg/L | 10 | 0.1 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 0.489 | 0.205 | 0.126 | 0.926 | 0.36 U | 0.507 | 0.25 | 0.38 | 0.442 | 0.250 U | 0.250 U | 0.250 U |
| PW-100A | mg/L | 10 | | | | | | 0.017 U | 0.1 U | 0.1 U | 0.008 U | | 0.033 J | 0.029 J | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.250 U | 0.250 U | 0.250 U | 0.250 U |
| PW-101A | mg/L | 10 | | | | | | 0.017 U | 0.1 U | 0.1 U | 0.142 | | 0.012 J | 0.1 U | 0.1 U | 0.1 U | | | | | | |
| PW-11 | mg/L | 10 | 10.6 | 5.5 | 5.2 | 4.8 | 5 U | 7 | 6.25 | 5.69 | 6.78 | 4.69 | 5.43 | 1.51 | 3.59 | 4.52 | 2 | 7.08 | 1.18 | 1.04 | 0.912 | 2.05 |
| PW-12 | mg/L | 10 | 0.1 U | 5 U | 5 U | 5 U | 5 U | 0.42 | 0.068 J | 5 U | 0.008 U | 0.1 U | 0.006 J | 0.1 U | 0.33 U | 0.28 | 0.48 | 0.34 | 0.322 | 0.25 U | 1.33 | 0.336 |
| PW-13 | mg/L | 10 | 97.5 | 29 | 27 | 22 | 22 | 1.44 | 1.02 | 0.99 | 39.3 | 60.5 | 45.8 | 57.7 | 0.85 | 9.53 | 3.39 | 5.67 | 20.0 | 6.28 | 9.79 | 11.2 |
| PW-14 | mg/L | 10 | 0.1 U | | | | | | | | | | | | 2.78 | | | | | | | |
| PW-15AR | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.66 | | | | | | | |
| PW-16A | mg/L | 10 | 0.1 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 1.67 | 1.2 | 1.87 | 1.5 | 1.34 | 1.84 | 0.93 | 0.78 | 0.867 | | 1.38 | 0.894 |
| PW-19A | mg/L | 10 | 1.63 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 3.1 | 2.4 | 2.71 | 2.96 | 2.82 | 1.52 | 1.92 | 3.64 | 2.84 | 2.11 | 2.77 | 4.03 |
| PW-20A | mg/L | 10 | 10.1 | | | | | | | | | | | | 4.6 | | | | | | | |
| PW-30A | mg/L | 10 | 0.66 | | | | | | | | | | | | 0.83 | | | | | | | |
| PW-31A | mg/L | 10 | 4.66 | | | | | | | | | | | | 13.2 | | | | | 10.7 | | 13.1 |
| PW-42A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.09 U | | | | | | | |
| PW-45A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.17 U | | | | | | | |
| PW-46A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.26 U | | | | | | | |
| PW-68A | mg/L | 10 | 2.33 | | | | | | | | | | | | 1.45 | | | | | | | |
| PW-69A | mg/L | 10 | 0.1 U | | | | | 0.017 U | 0.1 U | 0.1 U | 0.008 U | | 0.007 J | 0.1 U | 0.09 U | 0.1 U | 0.1 U | 0.1 U | 0.250 U | 0.250 U | 0.250 U | 0.250 U |
| PW-70AR | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.634 | | | | | | | |
| PW-71A | mg/L | 10 | 0.12 | | | | | | | | | | | | 0.12 U | | | | | | | |

**Table 5i. Nitrate Groundwater Concentrations in 2010 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Unit | Cleanup Level | Baseline 2000 | Spring 2010 | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-72A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.57 | | | | | | | |
| PW-73B | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.11 U | | | | | | | |
| PW-74B | mg/L | 10 | 0.23 | | | | | | | | | | | | 0.13 U | | | | | | | |
| PW-75A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.65 | | | | | | | |
| PW-76A | mg/L | 10 | 0.62 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 0.516 | 0.408 | 0.547 | 0.265 | 0.41 U | 0.64 | 0.31 | 0.31 | 0.276 | 0.344 | 0.561 | 0.351 |
| PW-77A | mg/L | 10 | 0.1 U | 5 U | 5 U | 5 U | 5 U | 0.31 | 5 U | 5 U | 0.234 | 0.402 | 0.274 | 0.312 | 0.27 U | 0.461 U | 0.24 | 0.34 | 0.325 | 0.250 U | 0.250 U | 0.380 |
| PW-78A | mg/L | 10 | | 5 U | 5 U | 5 U | 5 U | 0.11 | 5 U | 5 U | 0.315 | 0.411 | 0.315 | 0.507 | 0.46 U | 0.319 | 0.49 | 0.42 | 0.561 | 5.21 | 5.77 | 3.65 |
| PW-79A | mg/L | 10 | 7.54 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 0.55 | 0.312 | 0.029 J | 0.022 J | 0.16 U | 0.078 J | 2.31 | 1.56 | 2.51 | 2.29 | 2.84 | 2.63 |
| PW-80A | mg/L | 10 | 4.22 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 0.584 | 1.11 | 0.252 | 0.735 | 0.97 | 0.769 | 0.8 | 0.48 | 0.42 | 0.25 U | 1.31 J | 0.841 |
| PW-81A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.086 J | | | | | | | |
| PW-82A | mg/L | 10 | 9.25 | 6 | 5 | 6 | 5 | 6.81 | 6.23 | 5.99 | 4.34 | 2.61 | 2.59 | 3.83 | 3.72 | 3.48 | 2.86 | 2.45 | 2.93 | 1.65 | 3.75 | 5.59 |
| PW-83A | mg/L | 10 | 3.41 | | | | | | | | | | | | 0.632 | | | | | | | |
| PW-84AR | mg/L | 10 | 0.65 | | | | | | | | | | | | 1.35 | | | | | | | |
| PW-85A | mg/L | 10 | 1.02 | | | | | | | | | | | | 3.06 | | | | | | | |
| PW-86A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.85 | | | | | | | |
| PW-87A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.1 U | | | | | | | |
| PW-88A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.1 U | | | | | | | |
| PW-89A | mg/L | 10 | **177** | **38** | **28** | **23** | **22** | **18** | **18** | **76.5** | **40.8** | **116** | **74.3** | **77** | **140** | **59.6** J | 8.38 | 8.5 | **21.2** J | 4.49 | 4.78 | 1.55 |
| PW-91A | mg/L | 10 | 0.1 U | | | | | | | | | | | | 0.1 U | | | | | | | |
| PW-92A | mg/L | 10 | 1.43 | | | | | | | | | | | | 0.1 U | | | | | | | |
| PW-93A | mg/L | 10 | | | | | | 0.017 U | 0.1 U | 0.1 U | 0.008 U | | 0.014 J | 0.004 J | 0.1 U | 0.037 J | 0.1 U | 0.1 U | 0.250 U | 0.250 U | 0.250 U | 0.250 U |
| PW-94A | mg/L | 10 | | | | | | 0.017 U | 0.1 U | 0.1 U | 0.008 U | | 0.004 J | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.250 U | 0.250 U | 0.250 U | 0.250 U |
| PW-95A | mg/L | 10 | | | | | | 0.33 | 0.18 | 0.1 U | 0.008 U | | 0.487 | 0.588 | 0.29 U | 0.33 | 0.57 | 0.57 | 1.13 | 0.250 U | 0.600 | 0.250 U |
| PW-98A | mg/L | 10 | | 7.5 | 6.9 | 2.4 | 2.4 | 2.65 | **13.3** | **11.9** | 0.008 U | 1.16 | 5.41 | **21.7** | **24.3** J | 9.29 | **13.9** | **10.6** | 8.10 | **18.3** | 3.51 | 5.20 |
| PW-99A | mg/L | 10 | | 5 U | 5 U | 5 U | 5 U | 0.97 | 0.96 | 0.94 | 5.9 | **13.2** | 6.66 | 0.34 | 2.57 | 6.38 | 1.51 | 1.33 | 1.10 | 0.250 U | 1.65 | 0.823 |
| Solids Area | | | | | | | | | | | | | | | | | | | | | | |
| PW-07 | mg/L | 10 | **14.8** | | 5 U | | 5 U | | 5 U | | 5 U | | 9.14 | | 2.58 | | | 1.84 | | 0.354 | | 1.61 |
| PWF-1 | mg/L | 10 | | | 5 U | | 5 U | | 5 U | | 5 U | | 1.38 | | 2.31 | | | 1.46 | | 1.14 | | 0.429 |
| PWF-2 | mg/L | 10 | | | 5 U | | 5 U | | 5 U | | 5 U | | 0.016 | | 0.10 U | | | 0.10 U | | 0.250 U | | 0.250 U |

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

[3] Initial samples were collected in fall 2016 for EI-5, I-2, and I-3.

Solids Area sampled annually in August.

10-year rolling table. Refer to past annual reports for a full records of historical concentrations.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

E = estimated value above the calibration range

J = estimated value

mg/L = milligrams per liter

U = not detected above reporting limit

**Table 5j. Metal Groundwater Concentrations in 2012 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Analyte | Unit | Cleanup Level | Baseline 2000 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | |
| EW-1 | Arsenic | mg/L | 0.01 | 0.202 | 0.00632 U | 0.0269 | 0.0361 | 0.01 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.01 U | 0.00065 J | 0.00494 | 0.00313 J | 0.005 U | 0.00234 |
| EW-2 | Arsenic | mg/L | 0.01 | 0.203 | 0.0194 J | 0.0332 | 0.0319 | | | 0.05 U | 0.05 U | 0.00454 J | 0.025 U | 0.005 U | 0.0025 U | 0.00444 | 0.00327 | 0.005 U | 0.00338 |
| EW-3 | Arsenic | mg/L | 0.01 | 0.056 | 0.00632 U | 0.017 J | 0.0253 | 0.01 U | 0.00085 J | 0.01 U | 0.0012 J | 0.05 U | 0.025 U | 0.00051 J | 0.00027 J | 0.00122 | 0.005 U | 0.005 U | 0.001 U |
| PW-21A | Arsenic | mg/L | 0.01 | | 0.0122 J | 0.025 U | 0.025 U | 0.01 U | 0.00021 J | 0.01 U | | 0.0002 J | 0.00012 J | 0.00017 J | 0.00053 | 0.001 U | 0.001 U | 0.001 U | 0.001 U |
| PW-22A | Arsenic | mg/L | 0.01 | 0.0105 | 0.00632 U | 0.0113 J | 0.0129 J | 0.01 U | 0.00068 | 0.00552 J | 0.00457 | 0.00483 | 0.00907 | 0.00444 | 0.00409 | 0.00417 | 0.0044 | 0.00368 | 0.00442 |
| PW-23A | Arsenic | mg/L | 0.01 | 0.124 | 0.0501 | 0.0139 J | 0.00999 J | 0.01 U | 0.00613 | 0.0152 | 0.0327 | 0.00854 | 0.00702 | 0.00653 | 0.00584 | 0.0049 | 0.00486 | 0.00446 | 0.00568 |
| PW-24A | Arsenic | mg/L | 0.01 | | 0.00632 U | 0.025 U | 0.00665 J | 0.01 U | 0.00059 | 0.01 U | 0.00082 | 0.00067 | 0.00057 | 0.00032 J | 0.00048 J | 0.001 U | 0.001 U | 0.001 U | 0.001 U |
| PW-27A | Arsenic | mg/L | 0.01 | | 0.00632 U | 0.0118 J | 0.0124 J | 0.01 U | 0.00044 | 0.01 U | 0.00038 J | 0.00046 J | 0.00094 | 0.00027 J | 0.0004 J | 0.001 U | 0.001 U | 0.001 U | 0.001 U |
| PW-28A | Arsenic | mg/L | 0.01 | 0.239 | 0.331 | 0.109 J | 0.11 | 0.0109 J | 0.05 U | 0.05 U | 0.05 J | 0.05 U | 0.05 U | 0.00049 J | 0.00079 J | 0.0027 | 0.009 | 0.00273 J | 0.00357 |
| PW-50A | Arsenic | mg/L | 0.01 | 0.107 | 0.00632 U | 0.0175 J | 0.0178 J | 0.01 U | 0.00113 J | 0.00075 J | 0.001 J | 0.05 U | 0.025 U | 0.00089 J | 0.00062 J | 0.00153 | 0.00274 J | 0.01 U | 0.00235 |
| PW-51A | Arsenic | mg/L | 0.01 | 0.044 | 0.00632 U | 0.017 J | 0.013 J | 0.01 U | 0.00062 J | 0.05 U | 0.00122 | 0.00038 J | 0.00064 | 0.0011 | 0.00369 | 0.00148 | 0.00207 | 0.00094 J | 0.00571 |
| PW-52A | Arsenic | mg/L | 0.01 | 0.099 | 0.0106 J | 0.0292 | 0.0286 | 0.01 U | 0.05 U | 0.05 U | 0.0175 J | 0.05 U | 0.025 U | 0.01 U | 0.025 U | 0.00554 | 0.00889 | 0.01 U | 0.00627 |
| PW-96A | Arsenic | mg/L | 0.01 | | | | | | | | | 0.0174 | | | | | | 0.0138 | |
| EW-1 | Beryllium | mg/L | 0.001 | | | | | | | | | 0.0161 J | | | | | 0.0129 | | 0.0102 |
| EW-2 | Beryllium | mg/L | 0.001 | | | | | | | | | 0.0107 J | | | | | 0.00975 | | 0.00951 |
| PW-28A | Beryllium | mg/L | 0.001 | | | | | | | | | 0.00375 J | | | | | | 0.00913 | 0.00902 |
| PW-50A | Beryllium | mg/L | 0.001 | | | | | | | | | 0.00308 J | | | | | 0.00751 | | 0.00563 |
| PW-52A | Beryllium | mg/L | 0.001 | | | | | | | | | 0.02 J | | | | | 0.0236 | | 0.019 |
| EW-1 | Cadmium | mg/L | 0.005 | 0.0229 | 0.00584 | 0.0072 | 0.00622 | 0.0033 J | 0.00924 | 0.0109 | 0.0146 | 0.05 U | 0.05 U | 0.00844 J | 0.00878 | 0.00979 | 0.00864 | 0.00647 | 0.00461 |
| EW-2 | Cadmium | mg/L | 0.005 | 0.0465 | 0.00524 | 0.00721 | 0.00446 J | | | 0.271 | 0.108 | 0.911 | 0.0815 | 0.0546 | 0.0346 | 0.0216 | 0.0177 | 0.0113 | 0.00558 |
| EW-3 | Cadmium | mg/L | 0.005 | 0.026 | 0.00157 J | 0.00151 J | 0.00113 J | 0.0013 J | 0.00513 | 0.00686 J | 0.0266 | 0.05 U | 0.025 U | 0.00184 J | 0.00224 | 0.00153 | 0.00159 | 0.0024 | 0.00074 |
| PW-21A | Cadmium | mg/L | 0.005 | | 0.00031 J | 0.005 U | 0.005 U | 0.0005 J | 0.0005 U | 0.01 U | | 0.005 U | 0.0005 U | 0.0005 U | 0.0005 | 8.2E-05 J | 7.7E-05 J | 0.0002 U | 0.0002 U |
| PW-22A | Cadmium | mg/L | 0.005 | 0.00025 U | 0.00024 U | 0.00029 J | 0.00025 J | 0.0005 J | 0.0005 U | 0.01 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0002 U | 0.0002 U | 0.0002 U | 0.0002 U |
| PW-23A | Cadmium | mg/L | 0.005 | 0.00025 U | 0.00034 J | 0.005 U | 0.005 U | 0.0005 J | 0.0005 U | 0.01 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0002 U | 0.0002 U | 0.0002 U | 0.0002 U |
| PW-24A | Cadmium | mg/L | 0.005 | | 0.00024 U | 0.005 U | 0.005 U | 0.0006 J | 0.0005 U | 0.01 U | 0.0005 U | 0.0005 U | 0.00016 J | 0.0005 U | 0.0005 U | 4.3E-05 J | 4.5E-05 J | 0.0002 U | 0.0002 U |
| PW-27A | Cadmium | mg/L | 0.005 | | 0.00039 J | 0.00053 J | 0.005 U | 0.0005 J | 0.00017 J | 0.01 U | 0.001 U | 0.00013 J | 0.00019 J | 3.7E-05 J | 0.0005 U | 6.9E-05 J | 7.4E-05 J | 0.00012 J | 0.00005 J |
| PW-28A | Cadmium | mg/L | 0.005 | 0.0361 | 0.0182 J | 0.0255 | 0.0217 | 0.0072 | 0.078 U | 0.196 | 0.0655 | 0.05 U | 0.05 U | 0.00091 J | 0.005 U | 0.00585 | 0.0273 | 0.00494 | 0.00373 |
| PW-50A | Cadmium | mg/L | 0.005 | 0.025 | 0.00126 J | 0.00198 J | 0.00154 J | 0.0005 J | 0.00136 J | 0.00174 J | 0.0114 J | 0.05 U | 0.025 U | 0.0447 | 0.0583 | 0.0253 | 0.00572 | 0.0134 | 0.00204 |
| PW-51A | Cadmium | mg/L | 0.005 | 0.0127 | 0.0019 J | 0.00227 J | 0.00122 J | 0.0005 J | 0.005 U | 0.01 U | 0.00013 J | 0.00073 | 0.00105 | 0.00115 | 0.00073 J | 0.00112 | 0.00117 | 0.00095 J | 0.00133 |
| PW-52A | Cadmium | mg/L | 0.005 | 0.0171 | 0.00336 J | 0.00491 J | 0.00351 J | 0.0006 J | 0.021 | 0.0469 | 3.07 | 0.05 U | 0.00883 J | 0.0067 | 0.00385 J | 0.00559 | 0.00633 | 0.00513 | 0.00315 |
| EW-1 | Nickel | mg/L | 2 | 3.98 | | 0.722 | | 0.664 | 0.681 | 0.625 | 0.644 | 0.05 U | 0.634 | 0.786 J | 0.344 | 0.611 | 0.743 | 0.579 | 0.618 |
| EW-2 | Nickel | mg/L | 2 | 5.65 | | 1.06 | | | | 0.988 | 0.919 | 0.911 | 0.755 | 0.664 J | 0.362 | 0.63 | 0.716 | 0.558 | 0.776 |
| EW-3 | Nickel | mg/L | 2 | 2.58 | | 0.147 | | 0.138 | 0.126 | 0.146 | 0.594 | 0.05 U | 0.212 | 0.0779 J | 0.0912 | 0.119 | 0.161 | 0.218 | 0.147 |
| PW-21A | Nickel | mg/L | 2 | | | 0.02 U | | 0.0062 J | 0.00163 | 0.00764 | | 0.0005 U | 0.00966 | 0.00273 | 0.00915 | 0.00542 | 0.00983 | 0.00261 | 0.014 |
| PW-22A | Nickel | mg/L | 2 | 0.2 U | 0.0038 J | 0.02 U | | 0.0025 J | 0.00084 | 0.00971 J | 0.00136 | 0.0005 U | 0.00064 | 0.00066 | 0.0008 | 0.001 U | 0.001 U | 0.001 U | 0.001 U |
| PW-23A | Nickel | mg/L | 2 | 0.2 U | 0.0038 J | 0.02 U | | 0.0025 J | 0.00084 | 0.00071 J | 0.0007 | 0.0005 U | 0.00072 | 0.00033 J | 0.00042 J | 0.001 U | 0.001 U | 0.001 U | 0.001 U |
| PW-24A | Nickel | mg/L | 2 | 0.2 U | 0.0038 J | 0.02 U | | 0.0064 J | 0.00754 | 0.00246 J | 0.0048 | 0.0005 U | 0.00386 | 0.00315 | 0.00504 | 0.00125 | 0.00284 | 0.00164 | 0.00237 |
| PW-27A | Nickel | mg/L | 2 | | 0.0038 J | 0.00235 J | | 0.0039 J | 0.00917 | 0.00769 J | 0.00576 | 0.00013 J | 0.0121 | 0.00468 | 0.00492 | 0.00212 | 0.00098 J | 0.00222 | 0.0016 |
| PW-28A | Nickel | mg/L | 2 | 6.25 | | 3.63 | | 1.5 | 0.922 | 1.37 | 1.21 | 0.05 U | 0.805 | 0.637 J | 0.55 | 0.875 | 0.0309 | 1.11 | 1.06 |
| PW-50A | Nickel | mg/L | 2 | 3 | | 0.1 | | 0.109 | 0.162 | 0.0648 | 0.254 J | 0.05 U | 0.155 | 0.0632 J | 0.0549 | 0.068 | 0.497 | 0.0831 | 0.34 |
| PW-51A | Nickel | mg/L | 2 | 2 U | 0.3 | 0.327 | | 0.0287 | 0.075 | 0.0368 | 0.0824 | 0.00073 | 0.141 | 0.131 | 0.0879 | 0.0978 | 0.069 | 0.0945 | 0.0763 |
| PW-52A | Nickel | mg/L | 2 | 3.54 | 0.913 | 0.835 | | 1.17 | 1.14 | 1.04 | 0.907 | 0.05 U | 0.857 | 0.899 J | 0.685 | 0.689 | 0.964 | 0.718 | 0.869 |

**Table 5j. Metal Groundwater Concentrations in 2012 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Analyte | Unit | Cleanup Level | Baseline 2000 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fabrication Area | | | | | | | | | | | | | | | | | | | |
| MW-02A | Arsenic | mg/L | 0.01 | | | | | | | | | 0.0199 | | | | | 0.0215 | | 0.0200 |
| MW-03A | Arsenic | mg/L | 0.01 | | | | | | | | | 0.0114 | | | | | 0.0103 | | 0.0111 |
| PW-69A | Arsenic | mg/L | 0.01 | | | | | | | | | 0.0198 | | | | | 0.0201 | | 0.0221 |
| PW-93A | Arsenic | mg/L | 0.01 | | | | | | | | | 0.0232 | | | | | 0.0235 | | 0.0250 |
| PW-94A | Arsenic | mg/L | 0.01 | | | | | | | | | 0.0127 | | | | | 0.0119 | | 0.0254 |
| Solids Area | | | | | | | | | | | | | | | | | | | |
| PWB-1 | Arsenic | mg/L | 0.01 | | | | | | | | | 0.0101 | | | | | 0.0113 | | 0.0114 |
| PWB-2 | Arsenic | mg/L | 0.01 | | | | | | | | | 0.0142 | | | | | 0.0161 | | 0.0133 |
| PWE-1 | Arsenic | mg/L | 0.01 | | | | | | | | | 0.0103 | | | | | 0.0109 | | 0.0102 |

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

E = estimated value above the calibration range

J = estimated value

mg/L = milligrams per liter

U = not detected above reporting limit

Solids Area sampled annually in August.

8-year rolling table. Refer to past annual reports for a full records of historical concentrations.

Bold indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

**Table 5k. Miscellaneous Constituent Groundwater Concentrations in 2012 to 2019**

*ATI Millersburg Operations, Oregon*

| Well | Analyte | Unit | Cleanup Level | Baseline 2000 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014[1] | Spring 2015 | Spring 2016[2] | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | | | | | | | | | |
| EW-3 | Pentachlorophenol | µg/L | 1 | | | | | | | | | 4.08 J | | | | | 1.7 | | 1.32 |
| PW-50A | Pentachlorophenol | µg/L | 1 | | | | | | | | | 30.4 | | | | | 17.5 | | 11.3 |
| EW-1 | Radium-226 | pCi/L | 5[3] | 51 | 1.7 | 5.8 | 1.1 | 0.72 | 0.9 | 1.1 | 1.8 | 0.58 | 0.52 | 1.1 | 0.71 | 0.92 | 0.67 | 0.6 | 0.48 |
| EW-2 | Radium-226 | pCi/L | 5[3] | 68 | 14 | 47 | 8.2 | | | 14 | 10.6 | 6.3 | 7.7 | 7.6 | 10 | 4.7 | 3.3 | 3.8 | 6.4 |
| EW-3 | Radium-226 | pCi/L | 5[3] | 6.2 | 0.22 | 0.85 | 0.2 | 0.14 | 0.16 | 0.48 | 2.2 | 0.18 | 0.09 | 0.18 | 0.43 | 0.06 | 0.05 | 0.21 | 0.2 |
| PW-21A | Radium-226 | pCi/L | 5[3] | | 1.5 | 1.9 | 0.04 U | 0.46 | 0.43 | 1.2 | | 0.67 | 1.2 | 1.2 | 2.2 | 0.13 | 1.4 | 0.36 | 1.8 |
| PW-22A | Radium-226 | pCi/L | 5[3] | 0.2 | 0.59 | 1.2 | 0.2 | -0.06 | 0.18 | 0.39 | 0.3 | 0.19 | 0.41 | 0.12 J | 0.13 U | 0.17 | 0.13 J | 0.2 | 0.25 |
| PW-23A | Radium-226 | pCi/L | 5[3] | 13 | 1 | 0.58 | 0.04 U | 0.1 | -0.001 | 0.31 | 0.5 | 0.02 | -0.02 | 0.06 J | 0.04 U | 0.13 | 0.15 J | 0.06 | 0.32 |
| PW-24A | Radium-226 | pCi/L | 5[3] | 0.1 | 0.33 | 0.46 | 0.06 U | 0.04 | 0.11 | 0.04 | 0.2 | 0.06 | 0.07 | 0.05 J | 0.13 U | 0.13 | 0.13 J | 0.09 | 0.23 |
| PW-27A | Radium-226 | pCi/L | 5[3] | | 0.62 | 1.5 | 0.2 | 0.09 | 0.03 | 0.62 | 0.3 | 0.08 | 0.1 | 0.2 J | 0.03 U | 0.13 | 0.13 J | 0.13 | 0.21 |
| PW-28A | Radium-226 | pCi/L | 5[3] | 69 | 100 | 130 | 47.5 | 17 | 21 | 25 | 35.3 | 8.4 | 11 | 8.3 | 17 | 19 | 0.53 | 14 | 15 |
| PW-50A | Radium-226 | pCi/L | 5[3] | 4.5 | 1.7 | 6.8 | 1.8 | 1.2 | 1.7 | 0.67 | 2.1 | 1.3 | 0.74 | 0.44 | 0.5 | 2 | 1 | 0.4 J | 0.91 |
| PW-51A | Radium-226 | pCi/L | 5[3] | 0.5 | 0.51 | 1.8 | 0.1 | 0 | 0.06 | 0.34 | 0.4 | 0.22 | 0.12 | 0.2 | 0.62 | 0.2 | 0.38 | 0.27 J | 0.72 |
| PW-52A | Radium-226 | pCi/L | 5[3] | 12 | 2.3 | 13 | 1.6 | 0.42 | 1.8 | 1.7 | 3.3 | 0.38 | 0.25 | 0.29 | 0.25 | 0.27 | 0.35 | 0.3 J | 0.52 |
| EW-1 | Radium-228 | pCi/L | 5[3] | 14 | 2.4 | 4.9 | 1.8 | 2.2 | 3.5 | 4.5 | 4 | 1.8 | 2.9 | 2.7 | 1.3 | 3.9 | 7.1 | 4.2 | 5.3 |
| EW-2 | Radium-228 | pCi/L | 5[3] | 150 | 11 | 8.8 | 24.4 | | | 31 | 17 | 16 | 23 | 18 | 14 | 15 | 19 | 16 | 18 |
| EW-3 | Radium-228 | pCi/L | 5[3] | 0 | 1.6 | 1.2 | 0 | 0.4 J | 1.5 | 1.6 | 3.2 | 1 | 0.5 | 0.55 | 0.63 U | 0.39 | 0.1 | -0.05 | 0.29 |
| PW-21A | Radium-228 | pCi/L | 5[3] | | 4.3 | 6.8 | 0.2 U | 2.4 | -0.3 | 1.2 | | 1.4 | 3.1 | 1.5 | 3.6 | 0.65 | 4.1 | 0.3 | 1.8 |
| PW-22A | Radium-228 | pCi/L | 5[3] | 1.4 | 1.4 | 1.8 | 0.4 U | 1.9 | -0.2 | 0.45 | 0.7 U | 0.39 | 0.22 | 0.11 | -0.09 U | 0.64 | 1.5 | -0.21 | 0.68 |
| PW-23A | Radium-228 | pCi/L | 5[3] | 2.6 | 2.5 | 2.3 | 0.2 U | 1.4 | -1 | -0.3 | 1.4 | 0.45 | 0.34 | 0.08 | 0.23 U | 0.17 | 1.5 | -0.17 | 0.06 |
| PW-24A | Radium-228 | pCi/L | 5[3] | 1 | 1.3 | 0.8 | 0.2 U | 1.1 | -0.07 | 1.4 | 0.7 U | -0.94 | 0.24 | -0.2 | -0.3 U | 1.4 | -0.79 | 0.37 | 1.2 |
| PW-27A | Radium-228 | pCi/L | 5[3] | | 3.1 | 0.2 | 0.6 U | 3.3 | -0.1 | 1.4 | 1.5 | 1.4 | 0.45 | 0.05 | -0.21 U | 0.65 | 1.2 | 0.23 | 0.5 |
| PW-28A | Radium-228 | pCi/L | 5[3] | 140 | 17 | 9.3 | 56.5 | 32 | 34 | 54 | 42.6 | 13 | 23 | 15 | 19 | 27 | 1.4 | 29 | 31 |
| PW-50A | Radium-228 | pCi/L | 5[3] | 44 | 4.1 | 3.9 | 4.4 | 5.3 | 6.8 | 4.7 | 6 | 3.3 | 4.2 | 2.4 | 2.5 | 7.4 | 9.3 | 4.1 | 4.6 |
| PW-51A | Radium-228 | pCi/L | 5[3] | 1.7 | 1.2 | 1.3 | 0.3 U | 0.05 | 0.55 | 0.77 | 1.5 | 0.42 | -0.3 | 0.49 | 0.7 U | 1.2 | 0.33 | 1 | 3.2 |
| PW-52A | Radium-228 | pCi/L | 5[3] | 9.3 | 2.9 | 2.3 | 2.6 | 3 | 2.3 | 0.71 | 4.2 | -0.02 | 3.2 | 1.9 | 1.6 | 3.7 | 5.1 | 3.2 | 5 |
| Fabrication Area | | | | | | | | | | | | | | | | | | | |
| FW-3 | Pentachlorophenol | µg/L | 1 | | | | | | | | | 2.51 J | | | | | 1.80 | | 0.752 |
| PW-03A | Pentachlorophenol | µg/L | 1 | | | | | | | | | 5.55 | | | | | 1.80 | | 1.73 |
| PW-31A | Pentachlorophenol | µg/L | 1 | | | | | | | | | 2.61 | | | | | 2.27 | | |
| PW-82A | Pentachlorophenol | µg/L | 1 | | | | | | | | | 2.59 | | | | | 1.00 | | 0.314 |
| PW-83A | Pentachlorophenol | µg/L | 1 | | | | | | | | | 2.51 | | | | | 2.09 | | 2.31 |
| Solids Area | | | | | | | | | | | | | | | | | | | |
| PWF-1 | Cyanide | mg/L | 0.2 | | | | | | | | | 0.275 | | | | | 0.224 | | 0.251 |
| PWF-2 | Cyanide | mg/L | 0.2 | | | | | | | | | 0.323 | | | | | 0.0957 | | 0.393 |
| PW-07 | Radium-226 | pCi/L | 5 3 | | | 2.5 U | | 2.5 U | | 1.0 | | 0.21 | | | 0.18 | | 0.32 | | 0.3 |
| PW-07 | Radium-228 | pCi/L | 5 3 | | | 2.5 U | | 2.5 U | | 0.35 | | 0.69 | | | -0.11 | | -0.21 | | 0.25 |
| PWB-3 | Radium-226 | pCi/L | 5 3 | | | | | | | | | 1.5 | | | | | 11 | | 0.65 |
| PWB-3 | Radium-228 | pCi/L | 5 3 | | | | | | | | | 5.5 | | | | | 3.3 | | 3.5 |

**Table 5k. Miscellaneous Constituent Groundwater Concentrations in 2012 to 2019**

*ATI Millersburg Operations, Oregon*

Notes

[1] The fall 2014 monitoring event was conducted in February 2015.

[2] The spring 2016 event was a sitewide groundwater and surface water sampling event.

[3] Radium exceeds cleanup level if total of radium-226 and radium-228 exceeds 5 pCi/L.

Solids Area sampled annually in August.

8-year rolling table. Refer to past annual reports for a full records of historical concentrations.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

μg/L = micrograms per liter

E = estimated value above the calibration range

J = estimated value

pCi/L = picocuries per liter

U = not detected above reporting limit

**Table 6a. Spring Monitoring Event Schedule Summary in 2019**

ATI Millersburg Operations, Oregon

| Sample Location | Water Levels | Field Parameters | CVOCs | Ammonia[1] | Chloride | Fluoride | Total Metals | Nitrate | Radium-226/228 | TDS | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | |
| EW-4, EW-5, EW-6, PW-25A, PW-26A, PW-29A, PW-47A, PW-48A, PW-49A, PW-57A, PW-97A | X | | | | | | | | | | |
| PW-96A | X | X | X | | | | As | | | | |
| EW-1, EW-2, EW-3, PW-21A, PW-22A, PW-23A, PW-24A, PW-27A, PW-50A, PW-51A, PW-52A | X | X | | X | X | X | As, Cd, Ni | | X | X | |
| PW-28A | X | X | | X | X | X | As, Be, Cd, Ni | | X | X | |
| Fabrication Area | | | | | | | | | | | |
| MW-05A, MW-06A, MW-07A, MW-08A, MW-09A, MW-10A, MW-11A, PW-14, PW-15AR, PW-20A, PW-32A, PW-33A, PW-34A, PW-73A, PW-74A, PW-81A, PZ-01A | X | | | | | | | | | | |
| FW-1, FW-2, FW-4, FW-7, MW-01A, MW-02A, MW-03A, MW-04A, PW-30A, PW-31A, PW-42, PW-45A, PW-46A, PW-68A, PW-70AR, PW-71A, PW-72A, PW-73B, PW-74B, PW-75A, PW-85A, PW-86A, PW-87A, PW-88A, PW-91A, PW-101A | X | X | X | | | | | | | | |
| PW-01A, PW-03A, PW-83A, PW-84AR, PW-92A | X | X | X | X | | | | | | | |
| PW-89A | X | X | X | X | | X | | X | | | |

**Table 6a. Spring Monitoring Event Schedule Summary in 2019**

ATI Millersburg Operations, Oregon

| Sample Location | Water Levels | Field Parameters | CVOCs | Ammonia[1] | Chloride | Fluoride | Total Metals | Nitrate | Radium-226/228 | TDS | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-3, PW-10, PW-19A, PW-80A, PW-82A | X | X | X | | | X | | X | | | |
| I-2, I-3, E-11, EI-5, PW-13, PW-77A, PW-78A | X | X | X | | | X | | X | | | EISB |
| FW-6, PW-11, PW-12, PW-16A, PW-76A, PW-79A, PW-98A, PW-99A | X | X | X | | | X | | X | | | MNA |
| PW-69A, PW-93A, PW-94A, PW-95A, PW-100A | X | X | X | | | | | | | | EISB |
| FW-5 | X | X | | X | | | Fe, Mn | | | | |
| Surface Water | | | | | | | | | | | |
| MC-D, MC-M, MC-U | | X | X | | | X | | X | | | |
| TC-D, TC-U | | X | X | X | | | | | | | |

Notes

Spring monitoring event occurred between April 23 and May 14 in 2019.

[1] Sample is analyzed for ammonia and the result is converted to ammonium.

As = arsenic

Cd = cadmium

CVOCs = chlorinated volatile organic compounds

EISB = enhanced in situ bioremediation parameters (chloride, nitrate, sulfate, alkalinity)

Field parameters = temperature, specific conductivity, dissolved oxygen, pH, and oxidation-reduction potential

MC = Murder Creek

MNA = monitored natural attenuation parameters (chloride, nitrate, sulfate, alkalinity, methane, ethane, and ethene)

Ni = nickel

TC = Truax Creek

TDS = total dissolved solids

X = analyzed

**Table 6b. Fall Monitoring Event Schedule Summary in 2019**

ATI Millersburg Operations, Oregon

| Sample Location | Water Levels | Field Parameters | CVOCs | Ammonia[1] | Chloride | Fluoride | Total Metals | Nitrate | Radium-226/228 | TDS | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Area | | | | | | | | | | | |
| EW-4, EW-5, EW-6, PW-25A, PW-26A, PW-29A, PW-47A, PW-48A, PW-49A, PW-57A, PW-96A, PW-97A | X | | | | | | | | | | |
| PW-96A | X | X | X | | | | | | | | |
| PW-22A, PW-23A | X | X | | X | X | X | As, Cd, Ni | | X | X | |
| EW-3 | X | X | | X | X | X | As, Cd, Ni | | X | X | PCP |
| PW-21A, PW-24A, PW-27A, PW-51A | X | X | | X | X | X | As, Cd, Ni | X | X | X | |
| EW-1, EW-2, PW-28A, PW-52A | X | X | | X | X | X | As, Be, Cd, Ni | | X | X | |
| EW-50A | X | X | | X | X | X | As, Be, Cd, Ni | | X | X | PCP |
| Fabrication Area | | | | | | | | | | | |
| MW-05A, MW-06A, MW-07A, MW-08A, MW-09A, MW-10A, MW-11A, PW-14, PW-15AR, PW-20A, PW-32A, PW-33A, PW-34A, PW-73A, PW-74A, PZ-01 | X | | | | | | | | | | |
| FW-1, FW-2, FW-4, FW-7, MW-01A, MW-04A, PW-30A, PW-42A, PW-45A, PW-46A, PW-68A, PW-70AR, PW-71A, PW-72A, PW-73B, PW-74B, PW-75A, PW-81A, PW-85A, PW-86A, PW-87A, PW-88A, PW-91A, PW-101A | X | X | X | | | | | | | | |
| PW-01A, PW-84AR, PW-92A | X | X | X | X | | | | | | | |
| PW-83A | X | X | X | X | | | | | | | PCP |
| PW-89A | X | X | X | X | | X | | X | | | |

**Table 6b. Fall Monitoring Event Schedule Summary in 2019**

ATI Millersburg Operations, Oregon

| Sample Location | Water Levels | Field Parameters | CVOCs | Ammonia | Chloride | Fluoride | Total Metals | Nitrate | Radium-226/228 | TDS | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-5 | X | X | X | X | | X | Fe, Mn | X | | | |
| PW-03A | X | X | X | X | | | | X | | | PCP |
| PW-10, PW-19A, PW-80A | X | X | X | | | X | | X | | | |
| I-2, I-3, E-11, EI-5, PW-13, PW-77A, PW-78A | X | X | X | | | X | | X | | | EISB |
| FW-6, PW-11, PW-12, PW-16A, PW-76A, PW-79A, PW-98A, PW-99A | X | X | X | | | X | | X | | | MNA |
| FW-3, PW-82A | X | X | X | | | X | | X | | | PCP |
| PW-69A, PW-94A | X | X | X | | | X | As | | | | EISB, TOC |
| PW-95A | X | X | X | | | X | | | | | EISB, TOC |
| MW-02A, MW-04A | X | X | X | | | | As | | | | |
| PW-93A | X | X | X | | | | As | | | | EISB, TOC |
| PW-31A | X | X | X | | | | | X | | | |
| PW-100A | X | X | X | | | | | | | | EISB, TOC |
| Solids Area | | | | | | | | | | | |
| PWA-1, PWA-2, PWC-1, PWC-2, PWD-1, PWD-2 | X | X | | | X | | | | | | |
| PW-17B, PWB-18B, PWE-2 | X | X | | | X | X | | | | | |
| PWB-1, PWB-2, PWE-1 | X | X | | | X | X | As | | | | |
| PW-07 | X | X | | | X | X | | X | X | | |
| PWB-3 | X | X | | | X | X | | | X | | |
| PWF-1, PWF-2 | X | X | | | X | X | | | | | Cn |
| Surface Water | | | | | | | | | | | |
| MC-D, MC-M, MC-U | | X | X | | | X | | X | | | |
| TC-D, TC-U | | X | X | X | | | | | | | |

**Table 6b. Fall Monitoring Event Schedule Summary in 2019**

ATI Millersburg Operations, Oregon

Notes

Fall monitoring event occurred between October 2 and 30 in 2019 in the Fabrication and Extraction Areas.

Solids Area was sampled between August 15 and 22 in 2019. PW-09 was dry in 2019, so it was not sampled.

[1] Sample is analyzed for ammonia and the result is converted to ammonium.

As = arsenic

Be = beryllium

Cd = cadmium

Cn = cyanide

CVOCs = chlorinated volatile organic compounds

EISB = enhanced in situ bioremediation parameters (chloride, nitrate, sulfate, alkalinity)

Field parameters = temperature, specific conductivity, dissolved oxygen, pH, and oxidation-reduction potential

MC = Murder Creek

MNA = monitored natural attenuation parameters (chloride, nitrate, sulfate, alkalinity, methane, ethane, and ethene)

Ni = nickel

PCP = pentachlorophenol

TC = Truax Creek

TDS = total dissolved solids

TOC = total organic carbon

X = analyzed

**Table 7. Groundwater Elevations in 2019**

*ATI Millersburg Operations, Oregon*

| Well Information | | Spring | | | Fall | | |
|---|---|---|---|---|---|---|---|
| Well | TOC Elev (amsl) | Date | DTW (ft bgs) | GW Elev (amsl) | Date | DTW (ft bgs) | GW Elev (amsl) |
| Extraction Area (Biannual) | | | | | | | |
| EW-1 | 209.77 | 4/29/2019 | NM | NM | 9/30/2019 | 15.01 | 194.76 |
| EW-2 | 209.66 | 4/29/2019 | NM | NM | 9/30/2019 | NM | NM |
| EW-3 | 210.18 | 4/29/2019 | NM | NM | 9/30/2019 | 14.29 | 195.89 |
| EW-4 | 210.00 | 4/29/2019 | 21.52 | 188.48 | 9/30/2019 | 22.95 | 187.05 |
| EW-5 | 208.92 | 4/29/2019 | 21.08 | 187.84 | 9/30/2019 | 22.20 | 186.72 |
| EW-6 | 208.70 | 4/29/2019 | 20.06 | 188.64 | 9/30/2019 | 21.07 | 187.63 |
| PW-21A | 209.36 | 4/29/2019 | 22.02 | 187.34 | 9/30/2019 | 23.01 | 186.35 |
| PW-22A | 210.37 | 4/29/2019 | 18.69 | 191.68 | 9/30/2019 | 19.02 | 191.35 |
| PW-23A | 212.02 | 4/29/2019 | 20.76 | 191.26 | 9/30/2019 | 21.48 | 190.54 |
| PW-24A | 212.05 | 4/29/2019 | 20.75 | 191.30 | 9/30/2019 | 22.06 | 189.99 |
| PW-25A | 211.88 | 4/29/2019 | 22.02 | 189.86 | 9/30/2019 | 23.01 | 188.87 |
| PW-26A | 213.18 | 4/29/2019 | 25.25 | 187.93 | 9/30/2019 | 26.46 | 186.72 |
| PW-27A | 210.99 | 4/29/2019 | 14.71 | 196.28 | 9/30/2019 | 16.73 | 194.26 |
| PW-28A | 209.13 | 4/29/2019 | 14.32 | 194.81 | 9/30/2019 | 15.27 | 193.86 |
| PW-29A | 214.22 | 4/29/2019 | 20.15 | 194.07 | 9/30/2019 | 21.34 | 192.88 |
| PW-47A | 210.79 | 4/29/2019 | 24.36 | 186.43 | 9/30/2019 | 25.40 | 185.39 |
| PW-48A | 214.50 | 4/29/2019 | 18.72 | 195.78 | 9/30/2019 | 18.55 | 195.95 |
| PW-49A | 216.98 | 4/29/2019 | 29.87 | 187.11 | 9/30/2019 | 30.70 | 186.28 |
| PW-50A | 209.08 | 4/29/2019 | 16.37 | 192.71 | 9/30/2019 | 16.30 | 192.78 |
| PW-51A | 209.27 | 4/29/2019 | 14.06 | 195.21 | 9/30/2019 | 15.36 | 193.91 |
| PW-52A | 210.36 | 4/29/2019 | 13.82 | 196.54 | 9/30/2019 | 15.77 | 194.59 |
| PW-57A | 210.87 | 4/29/2019 | 24.37 | 186.50 | 9/30/2019 | 25.04 | 185.83 |
| PW-96A | 210.54 | 4/29/2019 | 21.36 | 189.18 | 9/30/2019 | 22.39 | 188.15 |
| PW-97A | 210.24 | 4/29/2019 | 24.04 | 186.20 | 9/30/2019 | 24.65 | 185.59 |
| Fabrication Area (Biannual) | | | | | | | |
| E-11 | 208.23 | 4/22/2019 | 5.27 | 202.96 | 10/1/2019 | 6.14 | 202.09 |
| EI-5 | 208.70 | 4/22/2019 | 5.94 | 202.76 | 10/1/2019 | 6.08 | 202.62 |
| FW-1 | 210.26 | 4/22/2019 | NM | NM | 10/1/2019 | NM | NM |
| FW-2 | 208.35 | 4/22/2019 | NM | NM | 10/1/2019 | NM | NM |
| FW-3 | 206.66 | 4/22/2019 | NM | NM | 10/1/2019 | NM | NM |
| FW-4 | 195.37 | 4/22/2019 | NM | NM | 10/1/2019 | NM | NM |
| FW-5 | 201.86 | 4/22/2019 | NM | NM | 10/1/2019 | NM | NM |
| FW-6 | 207.51 | 4/22/2019 | 11.55 | 195.96 | 10/1/2019 | 11.20 | 196.31 |
| FW-7 | 201.60 | 4/22/2019 | 9.53 | 192.07 | 10/1/2019 | 10.32 | 191.28 |
| I-2 | 207.35 | 4/22/2019 | 4.22 | 203.13 | 10/1/2019 | 4.44 | 202.91 |
| I-3 | 208.41 | 4/22/2019 | 3.72 | 204.69 | 10/1/2019 | 4.76 | 203.65 |
| MW-01A | 205.20 | 4/22/2019 | 11.16 | 194.04 | 10/1/2019 | 11.83 | 193.37 |
| MW-02A | 204.83 | 4/22/2019 | 7.70 | 197.13 | 10/1/2019 | 8.29 | 196.54 |
| MW-03A | 207.59 | 4/22/2019 | 6.01 | 201.58 | 10/1/2019 | 7.04 | 200.55 |

**Table 7. Groundwater Elevations in 2019**
*ATI Millersburg Operations, Oregon*

| Well Information | | Spring | | | Fall | | |
|---|---|---|---|---|---|---|---|
| Well | TOC Elev (amsl) | Date | DTW (ft bgs) | GW Elev (amsl) | Date | DTW (ft bgs) | GW Elev (amsl) |
| MW-04A | 204.62 | 4/22/2019 | 7.81 | 196.81 | 10/1/2019 | 8.29 | 196.33 |
| MW-05A | 213.98 | 4/22/2019 | 14.56 | 199.42 | 10/1/2019 | 15.57 | 198.41 |
| MW-06A | 211.64 | 4/22/2019 | 11.40 | 200.24 | 10/1/2019 | 13.78 | 197.86 |
| MW-07A | 200.49 | 4/22/2019 | 7.25 | 193.24 | 10/1/2019 | 9.14 | 191.35 |
| MW-08A | 201.23 | 4/22/2019 | 7.19 | 194.04 | 10/1/2019 | 8.91 | 192.32 |
| MW-09A | 210.00 | 4/22/2019 | 10.98 | 199.02 | 10/1/2019 | 13.25 | 196.75 |
| MW-10A | 212.49 | 4/22/2019 | 13.82 | 198.67 | 10/1/2019 | 15.67 | 196.82 |
| MW-11A | 211.02 | 4/22/2019 | 17.47 | 193.55 | 10/1/2019 | 18.11 | 192.91 |
| PW-01A | 211.44 | 4/22/2019 | 14.12 | 197.32 | 10/1/2019 | 14.15 | 197.29 |
| PW-03A | 210.50 | 4/22/2019 | 15.91 | 194.59 | 10/1/2019 | 16.03 | 194.47 |
| PW-10 | 211.53 | 4/22/2019 | 10.85 | 200.68 | 10/1/2019 | 10.69 | 200.84 |
| PW-11 | 208.53 | 4/22/2019 | 5.85 | 202.68 | 10/1/2019 | 6.50 | 202.03 |
| PW-12 | 209.97 | 4/22/2019 | 17.81 | 192.16 | 10/1/2019 | 10.58 | 199.39 |
| PW-13 | 207.78 | 4/22/2019 | 6.51 | 201.27 | 10/1/2019 | 6.27 | 201.51 |
| PW-14 | 209.52 | 4/22/2019 | 6.16 | 203.36 | 10/1/2019 | 6.44 | 203.08 |
| PW-15AR | 206.50 | 4/22/2019 | 20.06 | 186.44 | 10/1/2019 | 20.02 | 186.48 |
| PW-16A | 209.97 | 4/22/2019 | 17.64 | 192.33 | 10/1/2019 | 17.95 | 192.02 |
| PW-19A | 210.43 | 4/22/2019 | 13.06 | 197.37 | 10/1/2019 | 15.17 | 195.26 |
| PW-20A | 210.42 | 4/22/2019 | 16.77 | 193.65 | 10/1/2019 | 17.45 | 192.97 |
| PW-30A | 199.75 | 4/22/2019 | 5.32 | 194.43 | 10/1/2019 | 5.66 | 194.09 |
| PW-31A | 214.71 | 4/22/2019 | 8.09 | 206.62 | 10/1/2019 | 10.23 | 204.48 |
| PW-32A | 212.56 | 4/22/2019 | 8.68 | 203.88 | 10/1/2019 | 8.90 | 203.66 |
| PW-33A | 212.40 | 4/22/2019 | 6.44 | 205.96 | 10/1/2019 | 7.11 | 205.29 |
| PW-34A | 210.73 | 4/22/2019 | 10.66 | 200.07 | 10/1/2019 | 10.70 | 200.03 |
| PW-42A | 209.98 | 4/22/2019 | 8.70 | 201.28 | 10/1/2019 | 8.34 | 201.64 |
| PW-45A | 211.69 | 4/22/2019 | 12.22 | 199.47 | 10/1/2019 | 12.72 | 198.97 |
| PW-46A | 209.61 | 4/22/2019 | 14.59 | 195.02 | 10/1/2019 | 14.54 | 195.07 |
| PW-68A | 211.63 | 4/22/2019 | 7.00 | 204.63 | 10/1/2019 | 8.65 | 202.98 |
| PW-69A | 209.70 | 4/22/2019 | 5.36 | 204.34 | 10/1/2019 | 4.70 | 205.00 |
| PW-70AR | 210.57 | 4/22/2019 | 7.07 | 203.50 | 10/1/2019 | 7.17 | 203.40 |
| PW-71A | 210.06 | 4/22/2019 | 6.68 | 203.38 | 10/1/2019 | 6.69 | 203.37 |
| PW-72A | 210.13 | 4/22/2019 | 5.20 | 204.93 | 10/1/2019 | 5.15 | 204.98 |
| PW-73A | 210.86 | 4/22/2019 | 4.48 | 206.38 | 10/1/2019 | 4.34 | 206.52 |
| PW-73B | 211.23 | 4/22/2019 | 12.53 | 198.70 | 10/1/2019 | 12.48 | 198.75 |
| PW-74A | 209.81 | 4/22/2019 | 8.59 | 201.22 | 10/1/2019 | 8.48 | 201.33 |
| PW-74B | 209.64 | 4/22/2019 | 17.02 | 192.62 | 10/1/2019 | 16.83 | 192.81 |
| PW-75A | 197.57 | 4/22/2019 | 6.38 | 191.19 | 10/1/2019 | 7.48 | 190.09 |
| PW-76A | 207.94 | 4/22/2019 | 16.69 | 191.25 | 10/1/2019 | 16.69 | 191.25 |
| PW-77A | 209.03 | 4/22/2019 | 18.39 | 190.64 | 10/1/2019 | 18.81 | 190.22 |
| PW-78A | 208.96 | 4/22/2019 | 18.39 | 190.57 | 10/1/2019 | 18.90 | 190.06 |

**Table 7. Groundwater Elevations in 2019**

*ATI Millersburg Operations, Oregon*

| Well Information | | Spring | | | Fall | | |
|---|---|---|---|---|---|---|---|
| Well | TOC Elev (amsl) | Date | DTW (ft bgs) | GW Elev (amsl) | Date | DTW (ft bgs) | GW Elev (amsl) |
| PW-79A | 198.28 | 4/22/2019 | 6.65 | 191.63 | 10/1/2019 | 7.69 | 190.59 |
| PW-80A | 211.03 | 4/22/2019 | 12.83 | 198.20 | 10/1/2019 | 13.12 | 197.91 |
| PW-81A | 208.73 | 4/22/2019 | 5.97 | 202.76 | 10/1/2019 | 5.96 | 202.77 |
| PW-82A | 208.64 | 4/22/2019 | 7.82 | 200.82 | 10/1/2019 | 8.21 | 200.43 |
| PW-83A | 210.28 | 4/22/2019 | 13.32 | 196.96 | 10/1/2019 | 13.56 | 196.72 |
| PW-84AR | 209.70 | 4/22/2019 | 10.53 | 199.17 | 10/1/2019 | 10.28 | 199.42 |
| PW-85A | 212.85 | 4/22/2019 | 14.23 | 198.62 | 10/1/2019 | 13.99 | 198.86 |
| PW-86A | 208.91 | 4/22/2019 | 10.02 | 198.89 | 10/1/2019 | 9.73 | 199.18 |
| PW-87A | 211.49 | 4/22/2019 | 10.17 | 201.32 | 10/1/2019 | 9.55 | 201.94 |
| PW-88A | 211.89 | 4/22/2019 | 16.88 | 195.01 | 10/1/2019 | 16.02 | 195.87 |
| PW-89A | 202.40 | 4/22/2019 | 9.19 | 193.21 | 10/1/2019 | 8.81 | 193.59 |
| PW-91A | 198.19 | 4/22/2019 | 6.11 | 192.08 | 10/1/2019 | 7.43 | 190.76 |
| PW-92A | 208.77 | 4/22/2019 | 10.03 | 198.74 | 10/1/2019 | 10.72 | 198.05 |
| PW-93A | 209.95 | 4/22/2019 | 6.35 | 203.60 | 10/1/2019 | 6.36 | 203.59 |
| PW-94A | 210.03 | 4/22/2019 | 6.03 | 204.00 | 10/1/2019 | 5.90 | 204.13 |
| PW-95A | 210.81 | 4/22/2019 | 6.04 | 204.77 | 10/1/2019 | 6.37 | 204.44 |
| PW-98A | 209.15 | 4/22/2019 | 8.10 | 201.05 | 10/1/2019 | 8.08 | 201.07 |
| PW-99A | 207.44 | 4/22/2019 | 6.49 | 200.95 | 10/1/2019 | 5.48 | 201.96 |
| PW-100A | 210.34 | 4/22/2019 | 6.75 | 203.59 | 10/1/2019 | 7.19 | 203.15 |
| PW-101A | 210.67 | 4/22/2019 | 7.21 | 203.46 | 10/1/2019 | 6.96 | 203.71 |
| PZ-01A | 210.83 | 4/22/2019 | 7.51 | 203.32 | 10/1/2019 | 14.15 | 196.68 |
| Solids Area (Annual) | | | | | | | |
| PW-07 | 205.80 | | | | 8/15/2019 | 13.59 | 192.21 |
| PW-09 | 200.13 | | | | 8/15/2019 | Dry | |
| PW-17B | 184.14 | | | | 8/15/2019 | 10.96 | 173.18 |
| PW-18B | 188.24 | | | | 8/15/2019 | 20.46 | 167.78 |
| PWA-1 | 192.82 | | | | 8/15/2019 | 16.44 | 176.38 |
| PWA-2 | 193.04 | | | | 8/15/2019 | 16.14 | 176.90 |
| PWB-1 | 182.90 | | | | 8/15/2019 | 5.71 | 177.19 |
| PWB-2 | 182.94 | | | | 8/15/2019 | 5.98 | 176.96 |
| PWB-3 | 182.86 | | | | 8/15/2019 | 5.31 | 177.55 |
| PWC-1 | 202.69 | | | | 8/15/2019 | 18.11 | 184.58 |
| PWC-2 | 202.65 | | | | 8/15/2019 | 18.15 | 184.50 |
| PWD-1 | 192.51 | | | | 8/15/2019 | 22.64 | 169.87 |
| PWD-2 | 192.49 | | | | 8/15/2019 | 19.61 | 172.88 |
| PWE-1 | 190.50 | | | | 8/15/2019 | 13.22 | 177.28 |
| PWE-2 | 190.53 | | | | 8/15/2019 | 13.41 | 177.12 |
| PWF-1 | 204.76 | | | | 8/15/2019 | 21.54 | 183.22 |
| PWF-2 | 204.68 | | | | 8/15/2019 | 21.48 | 183.20 |

## Table 7. Groundwater Elevations in 2019

*ATI Millersburg Operations, Oregon*

Notes
Water levels not measured at actively pumping extraction wells.
DTW = depth to water
ft amsl = feet above mean sea level
ft bgs = feet below ground surface
GW Elev = groundwater elevation
NM = not measured
TOC Elev = top of casing elevation

**Table 8. Field Parameters in 2019**

*ATI Millersburg Operations, Oregon*

| Well | Temperature (°C) | | Specific Conductance (µS/cm) | | Dissolved Oxygen (mg/L) | | pH (unit) | | Oxidation-Reduction Potential (mV) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall |
| Extraction Area (Biannual) | | | | | | | | | | |
| EW-1 | 17.40 | 15.52 | 5,280 | 6,175 | 3.81 | 1.68 | 4.49 | 4.13 | 181.7 | 301.0 |
| EW-2 | 17.32 | 15.44 | 5,091 | 6,493 | 2.93 | 4.18 | 3.15 | 2.71 | 242.6 | 488.9 |
| EW-3 | 16.82 | 15.71 | 1,912 | 2,151 | 4.67 | 3.50 | 4.83 | 4.71 | 199.8 | 271.2 |
| PW-21A | 14.57 | 14.58 | 566 | 1,161 | 6.58 | 0.62 | 5.69 | 4.58 | 185.4 | 188.1 |
| PW-22A | 15.10 | 14.85 | 1,120 | 1,150 | 0.26 | 2.04 | 6.74 | 8.38 | -49.9 | -56.6 |
| PW-23A | 17.26 | 17.43 | 455 | 411 | 0.90 | 0.01 | 6.98 | 8.07 | 9.7 | 25.1 |
| PW-24A | 16.17 | 16.74 | 1,429 | 1,850 | 0.24 | 0.01 | 6.41 | 7.14 | 117.2 | 95.5 |
| PW-27A | 16.34 | 16.01 | 1,803 | 1,798 | 0.38 | 0.09 | 5.99 | 6.81 | 199.4 | 112.5 |
| PW-28A | 15.83 | 16.96 | 6,271 | 6,973 | 1.51 | 0.64 | 3.76 | 3.45 | 229.8 | 349.3 |
| PW-50A | 17.89 | 16.85 | 3,570 | 4,286 | 1.16 | 0.07 | 3.62 | 3.34 | 307.7 | 312.8 |
| PW-51A | 17.15 | 16.83 | 3,385 | 4,277 | 1.17 | 0.00 | 6.27 | 7.13 | 224.3 | 84.0 |
| PW-52A | 16.39 | 16.73 | 4,585 | 5,610 | 0.77 | 0.26 | 3.43 | 3.09 | 311.9 | 350.0 |
| PW-96A | 17.41 | 16.14 | 629 | 513 | 36.00 | 0.28 | 6.70 | 6.98 | -83.4 | -84.6 |
| Fabrication Area (Biannual) | | | | | | | | | | |
| E-11 | 14.79 | 18.91 | 654 | 669 | 2.30 | 5.14 | 6.57 | 7.33 | 175.3 | 112.8 |
| EI-5 | 15.28 | 18.55 | 2,247 | 1,670 | 0.54 | 0.07 | 6.34 | 8.26 | -48.8 | -69.4 |
| FW-1 | NS | 18.99 | NS | 155 | NS | 0.17 | NS | 6.66 | NS | 7.3 |
| FW-2 | NS | 17.26 | NS | 141 | NS | 0.85 | NS | 7.29 | NS | 84.6 |
| FW-3 | 13.50 | 15.19 | 322 | 278 | 10.93 | 9.66 | 6.62 | 8.02 | 79.5 | 94.3 |
| FW-4 | 13.96 | 16.93 | 214 | 210 | 2.40 | 3.23 | 7.14 | 6.96 | 67.5 | 105.4 |
| FW-5 | 16.01 | 17.18 | 2,058 | 2,124 | 6.33 | 4.20 | 7.18 | 7.67 | 201.4 | 65.0 |
| FW-6 | 15.31 | 16.55 | 416 | 439 | 2.51 | 21.91 | 6.71 | 6.71 | 98.1 | 169.1 |
| FW-7 | 12.17 | 14.55 | 307 | 281 | 0.15 | 0.12 | 6.67 | 6.41 | 69.2 | 15.7 |
| I-2 | 13.96 | 17.45 | 1,616 | 1,730 | 1.05 | 0.28 | 6.38 | 8.56 | -45.1 | -65.5 |
| I-3 | 14.70 | 18.68 | 1,083 | 350 | 0.62 | 0.39 | 7.29 | 7.99 | 25.7 | 13.9 |
| MW-01A | 12.35 | 14.88 | 293 | 313 | 0.31 | 0.16 | 6.22 | 6.30 | 125.9 | 76.9 |
| MW-02A | 13.24 | 15.90 | 357 | 355 | 0.14 | 0.13 | 6.90 | 7.22 | -99.0 | -131.7 |
| MW-03A | 12.62 | 14.57 | 451 | 445 | 0.21 | 0.17 | 6.89 | 7.30 | -74.6 | -116.9 |
| MW-04A | 11.82 | 15.90 | 330 | 343 | 0.16 | 0.63 | 6.56 | 6.71 | 43.0 | 8.4 |
| PW-01A | 16.03 | 18.33 | 8,943 | 11,362 | 0.93 | 0.24 | 5.70 | 5.46 | 267.6 | 234.2 |
| PW-03A | 16.10 | 17.06 | 3,753 | 3,514 | 0.64 | 0.01 | 6.62 | 7.03 | 221.7 | 107.0 |
| PW-10 | 12.88 | 19.77 | 112 | 134 | 211.00 | 0.22 | 5.51 | 5.78 | 114.5 | 79.8 |
| PW-11 | 13.80 | 20.19 | 107 | 156 | 1.03 | 0.20 | 5.98 | 6.58 | 198.4 | 155.0 |
| PW-12 | 13.70 | 16.62 | 254 | 307 | 1.97 | 0.35 | 6.61 | 6.80 | 206.5 | 47.9 |
| PW-13 | 14.76 | 18.54 | 8,799 | 863 | 0.43 | 0.26 | 6.11 | 6.20 | 161.6 | 162.7 |
| PW-16A | 14.10 | 15.64 | 204 | 207 | 0.86 | 0.61 | 6.24 | 6.40 | 167.0 | 177.5 |
| PW-19A | 16.57 | 16.28 | 130 | 133 | 2.86 | 0.81 | 5.83 | 5.91 | 148.0 | 146.7 |
| PW-30A | 16.77 | 17.84 | 173 | 161 | 0.43 | 0.52 | 6.06 | 6.53 | 149.1 | 169.5 |

**Table 8. Field Parameters in 2019**

*ATI Millersburg Operations, Oregon*

| Well | Temperature (°C) | | Specific Conductance (µS/cm) | | Dissolved Oxygen (mg/L) | | pH (unit) | | Oxidation-Reduction Potential (mV) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall |
| PW-31A | 15.91 | 16.59 | 356 | 280 | 1.23 | 0.15 | 6.40 | 6.28 | 113.6 | 112.3 |
| PW-42A | 16.49 | 18.68 | 287 | 247 | 37.00 | 0.12 | 6.73 | 7.98 | -54.4 | -45.7 |
| PW-45A | 16.20 | 18.06 | 220 | 210 | 0.72 | 0.21 | 5.96 | 6.27 | 137.2 | 55.2 |
| PW-46A | 14.82 | 15.36 | 176 | 144 | 0.31 | 0.56 | 6.72 | 7.00 | 97.5 | 127.2 |
| PW-68A | 14.31 | 19.14 | 161 | 163 | 5.00 | 3.61 | 6.45 | 6.47 | 128.8 | 104.7 |
| PW-69A | 15.09 | 19.10 | 291 | 274 | 0.53 | 0.08 | 6.65 | 6.91 | -72.7 | -99.4 |
| PW-70AR | 14.06 | 15.56 | 360 | 367 | 0.34 | 0.25 | 6.53 | 7.13 | 165.2 | 139.9 |
| PW-71A | 14.33 | 17.84 | 201 | 188 | 0.40 | 0.36 | 6.51 | 8.09 | 27.8 | -19.1 |
| PW-72A | 14.43 | 18.32 | 126 | 127 | 2.02 | 0.71 | 6.58 | 7.14 | 133.9 | 64.9 |
| PW-73B | 14.03 | 14.31 | 186 | 202 | 0.20 | 0.20 | 6.92 | 7.79 | 97.9 | 78.4 |
| PW-74B | 13.96 | 14.39 | 165 | 160 | 0.21 | 0.08 | 6.61 | 7.30 | 107.7 | 96.9 |
| PW-75A | 13.29 | 17.68 | 234 | 233 | 0.21 | 0.06 | 6.19 | 6.56 | 109.4 | 117.0 |
| PW-76A | 18.74 | 21.44 | 105 | 107 | 1.59 | 2.40 | 6.45 | 6.51 | 141.7 | 104.5 |
| PW-77A | 16.33 | 16.41 | 848 | 844 | 0.81 | 0.46 | 6.29 | 6.27 | 160.4 | 215.7 |
| PW-78A | 13.93 | 16.38 | 418 | 348 | 1.32 | 0.17 | 6.00 | 6.43 | 187.8 | 88.3 |
| PW-79A | 15.85 | 18.87 | 203 | 190 | 4.07 | 3.73 | 6.26 | 6.55 | 157.5 | 150.9 |
| PW-80A | 14.89 | 17.03 | 358 | 192 | 0.17 | 0.19 | 6.78 | 6.67 | 75.9 | 103.8 |
| PW-81A | | 17.49 | | 363 | | 0.22 | | 8.22 | | -38.7 |
| PW-82A | 13.67 | 17.13 | 379 | 347 | 0.21 | 0.19 | 6.38 | 6.35 | 154.4 | 186.2 |
| PW-83A | 18.24 | 20.58 | 964 | 813 | 0.05 | 0.01 | 6.61 | 7.24 | 131.7 | 78.4 |
| PW-84AR | 15.53 | 17.78 | 290 | 262 | 0.07 | 0.23 | 6.52 | 7.17 | 77.1 | 116.6 |
| PW-85A | 15.68 | 16.93 | 486 | 343 | 0.15 | 0.31 | 6.43 | 7.08 | 84.1 | 142.2 |
| PW-86A | 16.54 | 17.04 | 215 | 194 | 0.12 | 0.20 | 6.70 | 7.82 | 5.3 | 33.1 |
| PW-87A | 13.62 | 15.24 | 202 | 198 | 0.33 | 0.21 | 6.82 | 8.70 | -95.2 | -82.8 |
| PW-88A | 15.96 | 17.33 | 149 | 148 | 0.13 | 0.23 | 6.59 | 7.94 | 4.9 | 0.7 |
| PW-89A | 16.55 | 17.73 | 844 | 650 | 0.84 | 0.26 | 8.10 | 8.47 | 179.7 | 22.2 |
| PW-91A | 14.63 | 17.84 | 352 | 347 | 0.19 | 0.12 | 6.49 | 7.58 | 36.4 | 10.7 |
| PW-92A | 14.75 | 17.77 | 191 | 221 | 0.11 | 0.08 | 6.21 | 6.73 | 125.9 | 104.1 |
| PW-93A | 14.82 | 18.34 | 225 | 14 | 0.27 | 0.08 | 6.06 | 5.87 | -2.6 | -30.0 |
| PW-94A | 14.87 | 18.95 | 337 | 437 | 1.08 | 0.07 | 6.74 | 6.69 | -101.3 | -99.5 |
| PW-95A | 15.67 | 17.99 | 272 | 287 | 0.26 | 0.06 | 6.65 | 7.19 | 28.1 | -118.5 |
| PW-98A | 17.93 | 20.33 | 575 | 681 | 0.82 | 0.10 | 6.53 | 6.56 | 162.9 | 120.3 |
| PW-99A | 13.47 | 17.35 | 314 | 332 | 2.28 | 1.95 | 6.31 | 6.99 | 79.0 | 104.5 |
| PW-100A | 15.91 | 17.68 | 347 | 1,640 | 0.23 | 0.08 | 6.34 | 6.33 | -34.2 | -71.9 |
| PW-101A | 15.45 | 17.30 | 236 | 1,209 | 0.37 | 0.14 | 6.49 | 6.60 | 26.6 | -54.7 |
| TMW-3 | 14.87 | 17.95 | 2,975 | 2,869 | 0.69 | 0.67 | 5.77 | 7.25 | -6.0 | -27.6 |
| TMW-5 | 15.50 | 17.91 | 2,032 | 2,574 | 0.51 | 1.32 | 6.05 | 6.52 | -23.4 | -64.9 |

## Table 8.  Field Parameters in 2019

*ATI Millersburg Operations, Oregon*

| Well | Temperature (°C) | | Specific Conductance (µS/cm) | | Dissolved Oxygen (mg/L) | | pH (unit) | | Oxidation-Reduction Potential (mV) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall |
| Solids Area (Annual) | | | | | | | | | | |
| PW-07 | | 17.08 | | 423 | | 0.22 | | 6.98 | | -42.1 |
| PW-09 | | dry | | dry | | dry | | dry | | dry |
| PW-17B | | 13.09 | | 1,532 | | 0.40 | | 6.50 | | 17.4 |
| PW-18B | | 11.60 | | 213 | | 0.48 | | 5.50 | | 191.3 |
| PWA-1 | | 14.10 | | 3,151 | | 0.28 | | 6.57 | | 177.3 |
| PWA-2 | | 14.07 | | 4,376 | | 0.18 | | 6.46 | | 164.3 |
| PWB-1 | | 15.15 | | 1,266 | | 0.83 | | 6.70 | | 42.7 |
| PWB-2 | | 15.01 | | 1,275 | | 0.63 | | 6.76 | | -27.7 |
| PWB-3 | | 15.63 | | 9,679 | | 0.09 | | 6.25 | | -11.3 |
| PWC-1 | | 16.10 | | 788 | | 0.57 | | 6.12 | | 66.4 |
| PWC-2 | | 16.40 | | 826 | | 0.22 | | 6.14 | | 63.2 |
| PWD-1 | | 12.93 | | 3,286 | | 0.03 | | 6.59 | | 15.8 |
| PWD-2 | | 15.99 | | 3,856 | | 0.12 | | 6.98 | | 14.0 |
| PWE-1 | | 14.69 | | 822 | | 0.58 | | 6.81 | | 7.4 |
| PWE-2 | | 13.63 | | 1,562 | | 0.65 | | 6.58 | | -17.3 |
| PWF-1 | | 16.63 | | 3,006 | | 0.22 | | 6.89 | | 53.4 |
| PWF-2 | | 15.74 | | 3,257 | | 0.19 | | 6.86 | | 68.2 |
| Surface Water (Biannual) | | | | | | | | | | |
| MC-U | 15.44 | 11.06 | 218 | 379 | 9.85 | 4.19 | 7.70 | 5.10 | 198.8 | 242.7 |
| MC-M | 14.33 | 16.11 | 216 | 201 | 9.24 | 7.03 | 7.01 | 6.99 | 139.5 | 100.1 |
| MC-D | 13.83 | 14.71 | 216 | 197 | 9.83 | 7.84 | 6.81 | 6.79 | 159.3 | 114.2 |
| TC-U | 15.32 | 11.95 | 233 | 192 | 12.84 | 4.77 | 7.65 | 5.87 | 220.4 | 107.6 |
| TC-D | 14.04 | 12.42 | 257 | 973 | 11.85 | 3.43 | 7.23 | 6.64 | 211.9 | 70.6 |

Notes
Solids Area was sampled in August.
°C = degree Celsius
µS/cm = microsiemens per centimeter
MC = Murder Creek
mg/L = milligram per liter
mV = millivolt
NS = not sampled
TC = Truax Creek

**Table 9. Quarterly Extraction Well Results in 2019**

*ATI Millersburg Operations, Oregon*

| Well | TCA (µg/L) | | | | DCA (µg/L) | | | | PCE (µg/L) | | | | TCE (µg/L) | | | | DCE (µg/L) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall |
| Extraction Area | | | | | | | | | | | | | | | | | | | | |
| EW-2 | | | | | | | | | | | | | | | | | | | | |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | |
| FW-1 | 8.90 | [1] | 511 | 5.45 [2] | 35.3 | | 480 | 9.80 [2] | 0.400 U | | 2.16 | 0.700 [2] | 0.400 U | | 3.52 | 6.78 [2] | 1.80 | | 110 | 1.36 [2] |
| FW-2 | [1] | [1] | [1] | 0.220 J | [1] | [1] | [1] | 0.330 J | [1] | [1] | [1] | 0.260 J | [1] | [1] | [1] | 4.34 [1] | [1] | [1] | [1] | 0.200 J |
| FW-3 | 23.8 | 186 | 175 | 0.893 | 23.6 | 63.5 | 67.6 | 1.48 | 0.230 J | 1.43 | 1.04 | 0.400 U | 0.610 | 7.17 | 5.94 | 0.400 U | 33.1 | 97.7 | 82.9 | 0.274 J |
| FW-4 | 164 | 186 | 190 | 172 | 6.68 | 5.81 | 7.71 | 5.81 | 0.400 U | 0.230 J | 0.253 J | 0.400 U | 0.461 | 0.640 | 0.752 | 0.643 | 13.6 | 13.2 | 15.0 | 11.0 |
| FW-5 | | | | 0.400 U | | | | 5.42 | | | | 1.04 | | | | 23.5 | | | | 2.35 |
| FW-7[3] | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 2.65 | 2.54 | 2.07 | 1.60 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 21.3 | 22.4 | 8.66 | 5.40 |

| Well | VC (µg/L) | | | | Ammonium (mg/L) | | | | Fluoride (mg/L) | | | | Iron (mg/L) | | | | Manganese (mg/L) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall |
| Extraction Area | | | | | | | | | | | | | | | | | | | | |
| EW-2 | | | | | | 50.88 | | 61.75 | 20.0 U | 1.00 U | 8.20 | 10.0 U | | | | | | | | |
| Fabrication Area | | | | | | | | | | | | | | | | | | | | |
| FW-1 | 0.213 J | | 9.23 | 0.770 [2] | | | | | | | | | | | | | | | | |
| FW-2 | [1] | [1] | [1] | 0.270 J | | | | | | | | | | | | | | | | |
| FW-3 | 0.730 | 7.50 | 3.49 | 0.400 U | | | | | 2.85 | 2.11 | 2.14 | 2.25 | | | | | | | | |
| FW-4 | 0.235 J | 0.290 J | 0.393 J | 0.299 J | | | | | | | | | | | | | | | | |
| FW-5 | | | | 1.33 | | 203.8 | | 196.3 | | | | 24.3 | [1] | 0.435 | [1] | 0.459 | [1] | 1.250 | [1] | 1.310 |
| FW-7[3] | 5.42 | 4.74 | 5.52 | 2.43 | | | | | | | | | | | | | | | | |

| Well | Nitrate (mg/L) | | | | Combined Radium-226/228 (pCi/L) | | | | Total Dissolved Solids (mg/L) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall |
| Extraction Area | | | | | | | | | | | | |
| EW-2 | | | | | 34 | 19.8 | 15 | 24.4 | 3440 | 3590 | 492 | 2570 |
| Fabrication Area | | | | | | | | | | | | |
| FW-1 | | | | | | | | | | | | |
| FW-2 | | | | | | | | | | | | |
| FW-3 | 1.00 | 0.961 | 1.28 | 0.965 | | | | | | | | |
| FW-4 | | | | | | | | | | | | |
| FW-5 | | | | 11.8 | | | | | | | | |
| FW-7[3] | | | | | | | | | | | | |

**Table 9. Quarterly Extraction Well Results in 2019**

*ATI Millersburg Operations, Oregon*

Notes

[1] Extraction well not sampled because of operational issues that have since been remedied.

[2] Extraction well FW-1 was not operational after August 2019 because of recent bioremediation efforts. Fall and winter samples were collected using low-flow procedures.

[3] Extraction well FW-7 shutdown July 30, 2009, per U.S. Environmental Protection Agency; samples collected using low-flow sampling procedures.

µg/L = micrograms per liter

CVOC = chlorinated volatile organic compound

DCA = 1,1-dichloroethane

DCE = 1,1-dichloroethene

EW = Extraction Area extraction well

FW = Fabrication Area extraction well

J = estimated value

mg/L = milligrams per liter

PCE = tetrachloroethene

pCi/L = picocurries per liter

TCA = 1,1,1-trichloroethane

TCE = trichloroethene

U = not detected above reporting limit

VC = vinyl chloride

**Table 10. Groundwater Exceeding Cleanup Levels in 2019**

*ATI Millersburg Operations, Oregon*

| Area | TCA | DCA | PCE | TCE | DCE | VC | Ammonium | Beryllium | Cadmium | Cyanide | Fluoride | Nitrate | PCP (µg/L) | Radium-226/228 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cleanup Level* | *200 µg/L* | *3,700 µg/L 1,280 µg/L* [1] | *5 µg/L* | *5 µg/L* | *7 µg/L* | *2 µg/L* | *250 mg/L* | *0.001 mg/L* | *0.005 mg/L* | *0.2 mg/L* | *4 mg/L* | *10 mg/L* | *1 mg/L* | *5 pCi/L* |
| Fabrication | I-2, PW-13, PW-30A, PW-94A, PW-95A, PW-98A | I-2 | I-2, PW-69A, PW-93A | FW-1, FW-3, FW-5, I-2, PW-12, PW-13, PW-42A, PW-84AR, PW-85A, PW-86A, PW-89A, PW-98A | E-11, EI-5, FW-3, FW-4, FW-7, I-2, I-3, MW-01A, MW-02A, MW-04A, PW-12, PW-13, PW-30A, PW-42A, PW-69A, PW-77A, PW-78A, PW-79A, PW-80A, PW-84AR, PW-85A, PW-93A, PW-94A, PW-95A, PW-98A, PW-99A, PW-100A | EI-5, FW-3, FW-7, I-2, I-3, MW-01A, MW-02A, MW-04A, PW-12, PW-13, PW-42A, PW-45A, PW-69A, PW-80A, PW-86A, PW-93A, PW-94A, PW-95A, PW-98A, PW-100A, PW-101A | PW-01A | | | | E-11, EI-5, I-2, I-3, FW-5, FW-6, PW-10, PW-13, PW-69A, PW-89A, PW-94A, PW-95A, PW-98A, PW-99A | E-11, I-3, FW-5, PW-03A, PW-13, PW-31A | PW-03A, PW-83A | |
| Extraction | | | | | | PW-96A | | EW-1, EW-2, PW-28A, PW-50A, PW-52A | EW-1, EW-2, PW-50A, PW-52A | | EW-1, EW-3, PW-22A, PW-23A, PW-50A, PW-52A | PW-21A | EW-3, PW-50A | EW-1, EW-2, PW-28A, PW-50A, PW-52A |
| Solids | | | | | | | | | | PWF-1, PWF-2 | | | | |

Note

[1] DCA cleanup level is 3,700 µg/L in the Fabrication Area and 1,280 µg/L in the Extraction Area.

Wells analyzed for constituents listed in the Quality Assurance Project Plan for Sitewide Remedial Action Table B-1 (GSI, 2016) are presented if detected above the associated cleanup level.

Wells exceeding the cleanup standard in the spring monitoring event and/or the fall monitoring event are listed.

µg/L = micrograms per liter
DCA = 1,1-dichloroethane
DCE = 1,1-dichloroethene
mg/L = milligrams per liter
pCi/L = picocuries per liter
PCE = tetrachloroethene
PCP = pentachlorophenol
TCA = 1,1,1-trichloroethane
TCE = trichloroethene
VC = vinyl chloride

## Table 11. CVOC Results in 2019

*ATI Millersburg Operations, Oregon*

| | TCA (µg/L) | | DCA (µg/L) | | PCE (µg/L) | | TCE (µg/L) | | DCE (µg/L) | | VC (µg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cleanup Level* | *200* | | *1,280 (Extraction)<br>3,700 (Fabrication)* | | *5* | | *5* | | *7* | | *2* | |
| **Well** | **Spring** | **Fall** | **Spring** | **Fall** | **Spring** | **Fall** | **Spring** | **Fall** | **Spring** | **Fall** | **Spring** | **Fall** |
| Extraction Area | | | | | | | | | | | | |
| PW-96A | 10.2 | 9.39 | 22.7 | 28.0 | 0.400 U | 0.400 U | 3.04 | 3.02 | 1.15 | 0.770 | **2.98** | **4.37** |
| Fabrication Area | | | | | | | | | | | | |
| E-11 | 8.08 | 8.88 | 2.02 | 2.34 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | **13.0** | **15.3** | 0.440 | 0.760 |
| EI-5 | 144 | 10.0 U | 148 | 22.8 | 20.0 U | 10.0 U | 20.0 U | 10.0 U | **48.5** | 10.0 U | **26.5** | 10.0 U |
| FW-1 | | 5.45 | | 9.80 | | 0.700 | | **6.78** | | 1.36 | | 0.770 |
| FW-2 | | 0.220 J | | 0.330 J | | 0.260 J | | 4.34 | | 0.200 J | | 0.270 J |
| FW-3 | 186 | 0.893 | 63.5 | 1.48 | 1.43 | 0.400 U | **7.17** | 0.400 U | **97.7** | 0.274 J | **7.50** | 0.400 U |
| FW-4 | 186 | 172 | 5.81 | 5.81 | 0.230 J | 0.400 U | 0.640 | 0.643 | **13.2** | **11.0** | 0.29 J | 0.299 J |
| FW-5 | | 0.400 U | | 5.42 | | 1.04 | | **23.5** | | 2.35 | | 1.33 |
| FW-6 | 0.400 U | 1.18 | 0.951 | 1.90 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.325 J | 0.400 U | 0.400 U |
| FW-7 | 0.400 U | 0.400 U | 2.54 | 1.60 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | **22.4** | 5.40 | **4.74** | **2.43** |
| I-2 | **31,400** | **22,900** | **12,200** | **17,600** | 80.0 U | **30.6 J** | **110** | **67.5** | **2,990** | **3,290** | **560** | **724** |
| I-3 | 62.4 | 0.332 J | 12.1 | 1.15 | 1.70 | 0.400 U | 0.470 | 0.400 U | **95.6** | 3.96 | **156** | 0.381 J |
| MW-01A | 0.400 U | 0.400 U | 12.0 | 10.1 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | **48.3** | **43.7** | **9.72** | **13.4** |
| MW-02A | 0.400 U | 0.400 U | 7.53 | 8.74 | 0.400 U | 0.400 U | 0.200 J | 0.400 U | **15.5** | **20.2** | **26.6** | **27.1** |
| MW-03A | 0.400 U | 0.400 U | 0.400 U | 0.979 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.220 J | 2.32 | 0.400 U | 0.555 |
| MW-04A | 0.400 U | 0.400 U | 0.450 | 0.703 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | **7.96** | **12.3** | **2.87** | **5.27** |
| PW-01A | 0.400 U | 0.400 U | 0.260 J | 0.800 | 0.840 | 0.650 | 2.13 | 2.26 | 0.460 | 1.97 | 0.400 U | 0.730 |
| PW-03A | 0.400 U | 0.400 U | 1.16 | 1.91 | 0.400 U | 0.400 U | 1.94 | 3.42 | 3.22 | 3.85 | 0.372 J | 0.283 J |
| PW-10 | 22.5 | 23.1 | 34.3 | 34.5 | 1.16 | 1.2 | 1.32 | 1.24 | 2.33 | 2.99 | 0.400 U | 0.400 U |
| PW-11 | 3.00 | 1.71 | 2.35 | 1.67 | 0.25 J | 0.400 U | 0.200 J | 0.400 U | 3.61 | 2.46 | 0.400 U | 0.400 U |
| PW-12 | 6.80 | 149 | 6.07 | 30.6 | 0.400 U | 0.841 | **7.23** | **10.8** | **15.6** | **39.0** | **2.36** | **3.35** |
| PW-13 | **2,080** | **3,960** | 2,300 | 3,190 | 8.00 U | 8.00 U | **18.2** | **24.3** | **588** | **878** | **4.40 J** | **5.10 J** |
| PW-16A | 0.400 U | 0.257 J | 0.400 U | 0.395 J | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-19A | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |

**Table 11. CVOC Results in 2019**

*ATI Millersburg Operations, Oregon*

| | TCA (µg/L) | | DCA (µg/L) | | PCE (µg/L) | | TCE (µg/L) | | DCE (µg/L) | | VC (µg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cleanup Level* | *200* | | *1,280 (Extraction) 3,700 (Fabrication)* | | *5* | | *5* | | *7* | | *2* | |
| **Well** | **Spring** | **Fall** | **Spring** | **Fall** | **Spring** | **Fall** | **Spring** | **Fall** | **Spring** | **Fall** | **Spring** | **Fall** |
| PW-30A | **321** | **370** | 5.42 | 8.06 | 1.00 U | 2.00 U | 0.700 J | 2.00 U | **16.4** | **20.0** | 1 U | 2 U |
| PW-31A | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-42A | 0.400 U | 0.400 U | 63.4 | 48.4 | 1.25 | 2.74 | **68.0** | **166** | **11.8** | **9.78** | **4.58** J | **4.85** |
| PW-45A | 0.450 | 0.400 U | 1.19 | 2.82 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 4.64 | 6.09 | 0.860 | **11.7** |
| PW-46A | 0.400 U | 0.400 U | 1.27 | 0.464 | 0.400 U | 0.400 U | 1.29 | 0.540 | 1.72 | 0.674 | 0.575 | 0.400 U |
| PW-68A | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-69A | 86.0 | 2.44 | 47.6 | 45.1 | **5.95** | 1.38 | 2.00 U | 0.350 J | **9.95** | **7.99** | **2.20** | 1.39 |
| PW-70AR | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-71A | 0.400 U | 0.400 U | 8.15 | 0.740 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 1.01 | 0.400 U | 0.410 | 0.400 U |
| PW-72A | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-73B | 0.400 U | 0.400 U | 0.773 | 1.29 | 0.400 U | 0.400 U | 1.13 | 1.91 | 0.821 | 1.75 | 0.725 | 1.49 |
| PW-74B | 0.400 U | 0.400 U | 0.762 | 0.590 | 0.400 U | 0.400 U | 0.375 J | 0.320 J | 0.713 | 0.530 | 0.358 J | 0.340 J |
| PW-75A | 56.0 | 22.9 | 4.95 | 3.46 | 0.400 U | 0.400 U | 0.200 J | 0.400 U | 3.94 | 3.48 | 0.400 U | 0.400 U |
| PW-76A | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-77A | 0.400 U | 0.400 U | 8.88 | 11.9 | 0.400 U | 0.400 U | 1.08 | 1.05 | **12.2** | **9.74** | 0.400 U | 0.380 J |
| PW-78A | 19.6 | 19.8 | 50.7 | 30.4 | 0.613 | 0.560 | 2.21 | 1.41 | **73.8** | **43.6** | 0.400 U | 0.400 U |
| PW-79A | 11.3 | 10.8 | 11.6 | 11.7 | 0.580 | 0.363 J | 1.29 | 1.09 | **8.95** | 6.80 | 0.400 U | 0.400 U |
| PW-80A | 24.5 | 9.13 | 30.5 | 13.1 | 0.861 | 0.558 | 2.77 | 1.38 | **19.3** | 6.65 | **2.05** | 0.400 U |
| PW-81A | | 0.400 U | | 0.420 | | 0.400 U | | 0.850 | | 0.940 | | 0.370 J |
| PW-82A | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-83A | 0.400 U | 0.400 U | 0.577 | 0.510 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.964 | 0.91 | 0.433 | 0.420 |
| PW-84AR | 0.718 | 0.650 | 12.1 | 11.1 | 1.03 | 1.73 | **53.5** | **78.9** | **11.4** | **14.0** | 0.400 UJ | 0.310 J |
| PW-85A | 1.04 | 0.870 | 6.72 | 8.18 | 0.655 | 1.34 | **25.0** | **48.8** | **7.42** | **10.6** | 0.400 UJ | 0.240 J |
| PW-86A | 1.00 U | 0.400 U | 2.19 | 2.01 | 1.00 U | 0.230 J | **13.3** | **10.2** | 1.06 | 1.02 | **4.80** | **5.36** |
| PW-87A | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-88A | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 2.34 | 0.400 U | 0.400 U | 0.400 U | 0.400 UJ | 0.400 U |

## Table 11. CVOC Results in 2019

*ATI Millersburg Operations, Oregon*

| | TCA (µg/L) | | DCA (µg/L) | | PCE (µg/L) | | TCE (µg/L) | | DCE (µg/L) | | VC (µg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cleanup Level* | *200* | | *1,280 (Extraction)<br>3,700 (Fabrication)* | | *5* | | *5* | | *7* | | *2* | |
| Well | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall |
| PW-89A | 0.212 J | 0.321 J | 6.05 | 7.30 | 0.652 | 0.666 | **21.4** | **19.8** | 1.92 | 1.80 | 0.331 J | 0.375 J |
| PW-91A | 5.62 | 1.14 | 2.74 | 0.816 | 0.400 U | 0.400 U | 0.327 J | 0.400 U | 2.50 | 1.86 | 0.400 U | 0.400 U |
| PW-92A | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| PW-93A | 22.8 | 6.90 | 59.6 | 928 | 1.05 J | **5.25** | 2.00 U | 2.28 | **14.7** | **26.7** | **3.70** | **15.4** |
| PW-94A | **748** | **233** | 220 | 231 | 0.400 U | 2.70 | 4.00 U | 1.5 J | **57.8** | **80.6** | **4.60** | **24.8** |
| PW-95A | **805** | **568** | 564 | 1,830 | 1.68 | 3.70 J | 2.88 | 4.5 | **68.2** | **191** | 0.900 J | **6.10** |
| PW-98A | **466** | **474** | 326 | 399 | 2.85 | 2.24 J | **21.8** | **20.7** | **772** | **830** | **93.6** | **99.5** |
| PW-99A | 41.5 | 13.2 | 37.4 | 17.2 | 2.00 U | 1.00 U | 1.35 J | 0.6 J | **368** | **139** | 1.60 J | 0.600 J |
| PW-100A | 149 | 4.10 | 333 | 62.6 | 4.20 | 1.60 J | 2.80 J | 2 U | **51.0** | 1.50 J | **23.8** | **4.40** |
| PW-101A | 4.00 U | 3.35 | 19.4 | 30.8 | 4.00 U | 0.400 U | 4.20 | 1.63 | 4.00 U | 2.13 | **4.3** | 0.810 |
| Surface Water | | | | | | | | | | | | |
| MC-D | 0.466 | 4.99 | 0.400 U | 1.45 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.786 | 0.400 U | 0.400 U |
| MC-M | 1.39 | 4.78 | 0.295 J | 1.85 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 1.49 | 0.400 U | 0.400 U |
| MC-U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |
| TC-D | 0.400 U | 0.540 | 0.400 U | 0.640 | 0.400 U | 0.400 U | 0.400 U | 1.03 | 0.400 U | 1.08 | 0.400 U | 0.960 |
| TC-U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U |

Notes

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2015).

µg/L = micrograms per liter

DCA = 1,1-dichloroethane

DCE = 1,1-dichloroethene

J = estimated value

PCE = tetrachloroethene

TCA = 1,1,1-trichloroethane

TCE = trichloroethene

U = not detected above reporting limit

UJ = not detected above reporting limit; however, the reported detection limit is estimated

VC = vinyl chloride

**Table 12. FCCA EISB Performance Monitoring**

*ATI Millersburg Operations, Oregon*

| Parameter | Units | Cleanup Standard | Source Area Well | | | Injection Area Wells | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PW-93A | | | PW-100A | | | PW-94A | | | PW-69A | | | PW-95A | | |
| | | | Baseline | Baseline | Post Inj #2 | Baseline | Baseline | Post Inj #2 | Baseline | Baseline | Post Inj #2 | | Baseline | Post Inj #2 | | Baseline | Post Inj #2 |
| | | | 5/10 | 5/19 | 10/19 | 8/10 | 5/19 | 10/19 | 5/10 | 5/19 | 10/19 | 5/11 | 5/19 | 10/19 | 5/11 | 5/19 | 10/19 |
| CVOCs | | | | | | | | | | | | | | | | | |
| 1,1,1- TCA | µg/L | 200 | 11,100 | 22.8 | 6.90 | 0.99 | 149 | 4.10 | 39 | 748 | 233 | 245 | 86.0 | 2.44 | 234 | 805 | 568 |
| 1,1-DCA | µg/L | 3,700 | 2,370 | 59.6 | 928 | 5.5 | 333 | 62.6 | 25.7 | 220 | 231 | 189 | 47.6 | 45.1 | 3.16 | 564 | 1,830 |
| 1,2-DCA | µg/L | 5 | 25 U | 2.00 U | 1.00 U | 0.5 U | 4.00 U | 2.00 U | 0.5 U | 4.00 U | 2.00 U | 5 U | 2.00 U | 0.400 U | 0.5 U | 1.00 U | 4.00 U |
| Chloroethane | µg/L | - | 288 | 708 | 6,220 | 0.72 | 1,880 | 890 | 85.5 | 79.0 | 1,680 | 89.1 | 92.4 | 32.3 | 21.3 | 180 | 668 |
| PCE | µg/L | 5 | 31.5 | 1.05 J | 5.25 | 7.23 | 4.20 | 1.60 J | 0.5 U | 4.00 U | 2.70 | 7.12 | 5.95 | 1.38 | 0.65 | 1.68 | 3.70 J |
| TCE | µg/L | 5 | 16.7 J | 2.00 U | 2.28 | 43 | 2.80 J | 2.00 U | 0.31 J | 4.00 U | 1.50 J | 3.96 | 2.00 U | 0.350 J | 1.9 | 2.88 | 4.50 |
| 1,1-DCE | µg/L | 7 | 905 | 14.7 | 26.7 | 6.09 | 51.0 | 1.50 J | 1.9 | 57.8 | 80.6 | 28.4 | 9.95 | 7.99 | 8.18 | 68.2 | 191 |
| cis-1,2-DCE | µg/L | 70 | 31.9 | 2.00 U | 11.7 | 83.4 | 9.30 | 5.80 | 1.2 | 4.00 U | 2.35 | 5.2 | 6.80 | 7.67 | 2.74 | 7.35 | 7.30 |
| trans-1,2-DCE | µg/L | 100 | 25 U | 2.00 U | 1.00 U | 12.2 | 4.00 U | 2.25 | 0.5 U | 4.00 U | 2.00 U | 5 U | 2.00 U | 0.400 U | 0.5 U | 1.00 U | 4.00 U |
| VC | µg/L | 2 | 13.5 J | 3.70 | 15.4 | 5.18 | 23.8 | 4.40 | 1.7 | 4.60 | 24.8 | 3.8 J | 2.20 | 1.39 | 2.1 | 0.900 U | 6.10 |
| Dissolved Hydrocarbon Gases | | | | | | | | | | | | | | | | | |
| Methane | µg/L | - | 539 | 13,000 | 8,500 | 31.5 | 15,000 | 4,200 | NS | 4,800 | 6,700 | 1,310 | 2,700 | 4,100 | 58.2 | 720 | 1,700 |
| Ethane | µg/L | - | 0.54 J | 1.0 U | 1.0 U | 0.15 J | 2.5 | 1.0 U | NS | 1.8 | 1.5 | 0.12 J | 1.0 U | 1.0 U | 0.09 U | 1.0 U | 1.0 U |
| Ethene | µg/L | - | 1.92 | 4.8 | 3.3 | 0.76 J | 17 | 8.1 | NS | 1.9 | 19 | 0.13 J | 1.0 U | 1.0 U | 0.096 U | 1.0 U | 1.6 |
| General Chemistry | | | | | | | | | | | | | | | | | |
| Chloride | mg/L | - | 57 | 10.3 | 48.8 | 12 | 16.2 | 20.5 | 13 | 20.2 | 16.9 | 21 | 14.8 | 9.49 | 42 | 14.5 | 14.5 |
| Nitrate | mg/L | 10 | 5 U | 0.250 U | 0.250 U | 5 U | 0.250 U | 0.250 U | 5 U | 0.250 U | 0.250 U | 5 U | 0.250 U | 0.250 U | 5 U | 0.600 | 0.250 U |
| Sulfate | mg/L | - | 10 U | 1.00 U | 1.00 U | 10 U | 1.00 U | 1.00 U | 10 U | 1.00 U | 1.00 U | 10 U | 1.00 U | 1.00 U | 10 U | 4.00 | 1.43 |
| Alkalinity | mg/L | - | 128 | 85.0 | 534 | 112 | 154.0 | 753 | 174 | 103 | 152 | 101 | 100 | 96.9 | 68 | 101 | 110 |
| Total Organic Carbon | | | | | | | | | | | | | | | | | |
| Total Organic Carbon | mg/L | - | 5 | NS | 461 | 13 | NS | 369 | 5 U | NS | 82.2 | 18 | NS | 14.5 | 5.46 | NS | 4.17 |
| Metals | | | | | | | | | | | | | | | | | |
| Iron | mg/L | - | 4 | NS | NS | 3.21 | NS | NS | 5.4 | NS | NS | 5.8 | NS | NS | 0.34 | NS | NS |
| Sodium | mg/L | - | 29 | NS | NS | 11.6 | NS | NS | 32 | NS | NS | 22 | NS | NS | 36 | NS | NS |
| Parameters | | | | | | | | | | | | | | | | | |
| ORP | mV | - | 28.7 | -2.6 | -30.0 | 33.1 | -34.2 | -71.9 | -66.2 | -101.3 | -99.5 | -117.5 | -72.7 | -99.4 | -84.2 | 28.1 | -118.5 |
| Dissolved Oxygen | mg/L | - | 0.86 | 0.27 | 0.08 | 0.64 | 0.23 | 0.08 | 0.36 | 1.08 | 0.07 | 0.28 | 0.53 | 0.08 | 0.13 | 0.26 | 0.06 |

**Table 12. FCCA EISB Performance Monit**

*ATI Millersburg Operations, Oregon*

| Parameter | Units | Cleanup Standard | Injection Area Well | | | Perimeter Area Well | | |
|---|---|---|---|---|---|---|---|---|
| | | | PW-101A | | | FW-1 | | |
| | | | 5/11 | Baseline 5/19 | Post Inj #2 10/19 | Baseline 9/10 | Baseline 8/19 | Post Inj #2 10/19 |
| **CVOCs** | | | | | | | | |
| 1,1,1- TCA | µg/L | 200 | 6.78 | 4.00 U | 3.35 | **1,922** | **511** | 5.45 |
| 1,1-DCA | µg/L | 3,700 | 591 | 19.4 | 30.8 | 366 | 480 | 9.80 |
| 1,2-DCA | µg/L | 5 | 1.1 U | 4.00 U | 0.400 U | 0.5 U | 0.400 U | 0.400 U |
| Chloroethane | µg/L | - | 161 | 1,500 | 329 | 38.1 | 310 | 5.00 U |
| PCE | µg/L | 5 | 3.89 | 4.00 U | 0.400 U | 1.89 | 2.16 | **6.78** |
| TCE | µg/L | 5 | 3.89 | 4.20 | 1.63 | 3.58 | 3.52 | **6.78** |
| 1,1-DCE | µg/L | 7 | **183** | 4.00 U | 2.13 | **239** | **110** | 1.36 |
| cis-1,2-DCE | µg/L | 70 | 20.1 | 5.00 | 2.50 | 9.86 | 6.68 | 9.24 |
| trans-1,2-DCE | µg/L | 100 | 0.5 U | 4.00 U | 0.400 U | 0.5 U | 0.400 U | 0.430 |
| VC | µg/L | 2 | **31.2** | **4.30** | 0.810 | **5.89** | **9.23** | 0.770 |
| **Dissolved Hydrocarbon Gases** | | | | | | | | |
| Methane | µg/L | - | 268 | NS | NS | | | |
| Ethane | µg/L | - | 0.38 J | NS | NS | | | |
| Ethene | µg/L | - | 3.11 | NS | NS | | | |
| **General Chemistry** | | | | | | | | |
| Chloride | mg/L | - | 15 | NS | NS | | | |
| Nitrate | mg/L | 10 | 5 U | NS | NS | | | |
| Sulfate | mg/L | - | 10 U | NS | NS | | | |
| Alkalinity | mg/L | - | 34 | NS | NS | | | |
| **Total Organic Carbon** | | | | | | | | |
| Total Organic Carbon | mg/L | - | 5.69 | NS | NS | | | |
| **Metals** | | | | | | | | |
| Iron | mg/L | - | 0.78 | NS | NS | | | |
| Sodium | mg/L | - | 13.2 | NS | NS | | | |
| **Parameters** | | | | | | | | |
| ORP | mV | - | 52.3 | 26.6 | -54.7 | | | |
| Dissolved Oxygen | mg/L | - | 0.45 | 0.37 | 0.14 | | | |

Notes

– = no applicable cleanup level

µg/L = micrograms per liter

CVOC = chlorinated volatile organic compound

DCA = dichloroethane

DCE = dichloroethene

EISB = enhanced in situ bioremediation

FCCA = Former Crucible Cleaning Area

J = estimated value below reporting limit

mg/L = milligrams per liter

NS = not sampled

ORP = oxidation-reduction potential

PCE = tetrachloroethene

Post Inj #2 = After second round of EISB injections that occurred in August 2019. First round of EISB injections took place in 2010.

TCA = trichloroethane

TCE = trichloroethene

U = not detected above reporting limit

VC = vinyl chloride

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action Table B-4 for more details (GSI, 2016).

**Table 13. Surface Water Analytical Results in 2019**

*ATI Millersburg Operations, Oregon*

| | TCA (µg/L) | | DCA (µg/L) | | PCE (µg/L) | | TCE (µg/L) | | DCE (µg/L) | | VC (µg/L) | | Ammonium (mg/L) | | Fluoride (mg/L) | | Nitrate (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cleanup Level*[1] | *18,000* | | *none* | | *840* | | *21,900* | | *11,600* | | *none* | | *FBV*[2] | | *none* | | *none* | |
| Sample Location | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall |
| Murder Creek | | | | | | | | | | | | | | | | | | |
| MC-U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | -- | -- | 1.00 U | 1.00 U | 2.66 | 0.326 |
| MC-M | 1.39 | 4.78 | 0.295 J | 1.85 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 1.49 | 0.400 U | 0.400 U | -- | -- | 1.00 U | 1.31 | 2.76 | 3.61 |
| MC-D | 0.466 | 4.99 | 0.400 U | 1.45 | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.786 | 0.400 U | 0.400 U | -- | -- | 1.00 U | 1.30 | 2.60 | 1.06 |
| Truax Creek | | | | | | | | | | | | | | | | | | |
| TC-U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.400 U | 0.031 | 0.045 | -- | -- | -- | -- |
| TC-D | 0.400 U | 0.540 | 0.400 U | 0.640 | 0.400 U | 0.400 U | 0.400 U | 1.03 | 0.400 U | 1.08 | 0.400 U | 0.960 | 0.096 | 4.21 | -- | -- | -- | -- |

Notes

[1] Cleanup level is based on the DEQ's AWQC for aquatic receptors (Table 30).

[2] Ammonia standard is dependent on pH and temperature. For example, the standard would be 28 mg/L for a pH of 6.8 units at 15 degrees Celsius.

**Bold** indicates that the concentration meets or exceeds the cleanup standard. Refer to Quality Assurance Project Plan for Sitewide Remedial Action, Table B-4, for more details (GSI, 2015).

-- = not analyzed

µg/L = micrograms per liter

AWQC = ambient water quality criteria

DEQ = Oregon Department of Environmental Quality

DCA = 1,1-dichloroethane

DCE = 1,1-dichloroethene

FBV = function based value; see Table 30(b) in the DEQ's AWQC for aquatic receptors for more details

J = estimated value

MC = Murder Creek

mg/L = milligrams per liter

PCE = tetrachloroethene

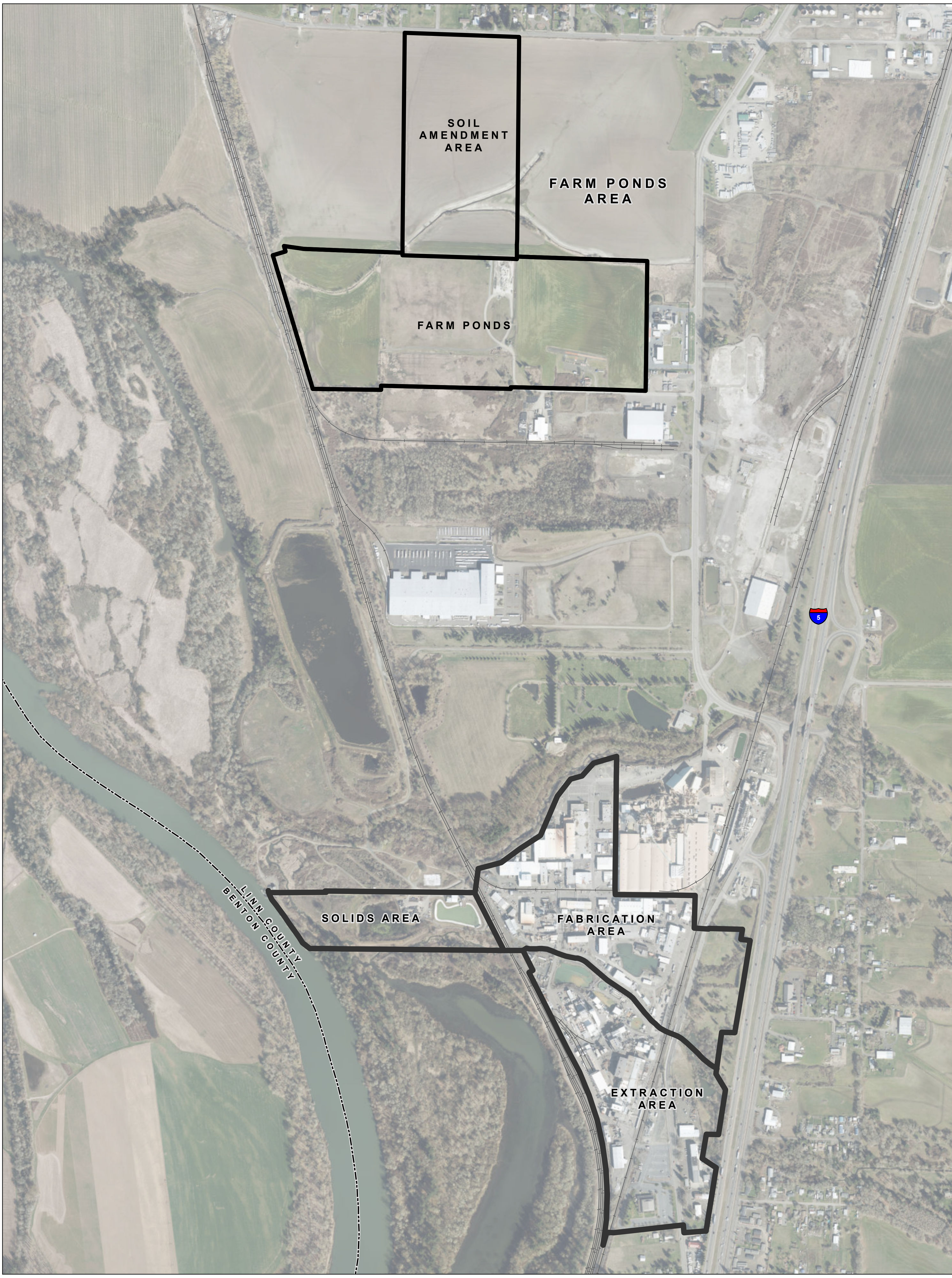
TC = Truax Creek

TCA = 1,1,1-trichloroethane

TCE = trichloroethene

U = not detected above reporting limit

VC = vinyl chloride




**LEGEND**

Property Boundary

Railroad

County Boundary

Date: March 9, 2020
Data Sources: OGIC, USGS, DigiGlobe

# FIGURE 1

**Millersburg Operations**

*ATI Millersburg Operations, Oregon*

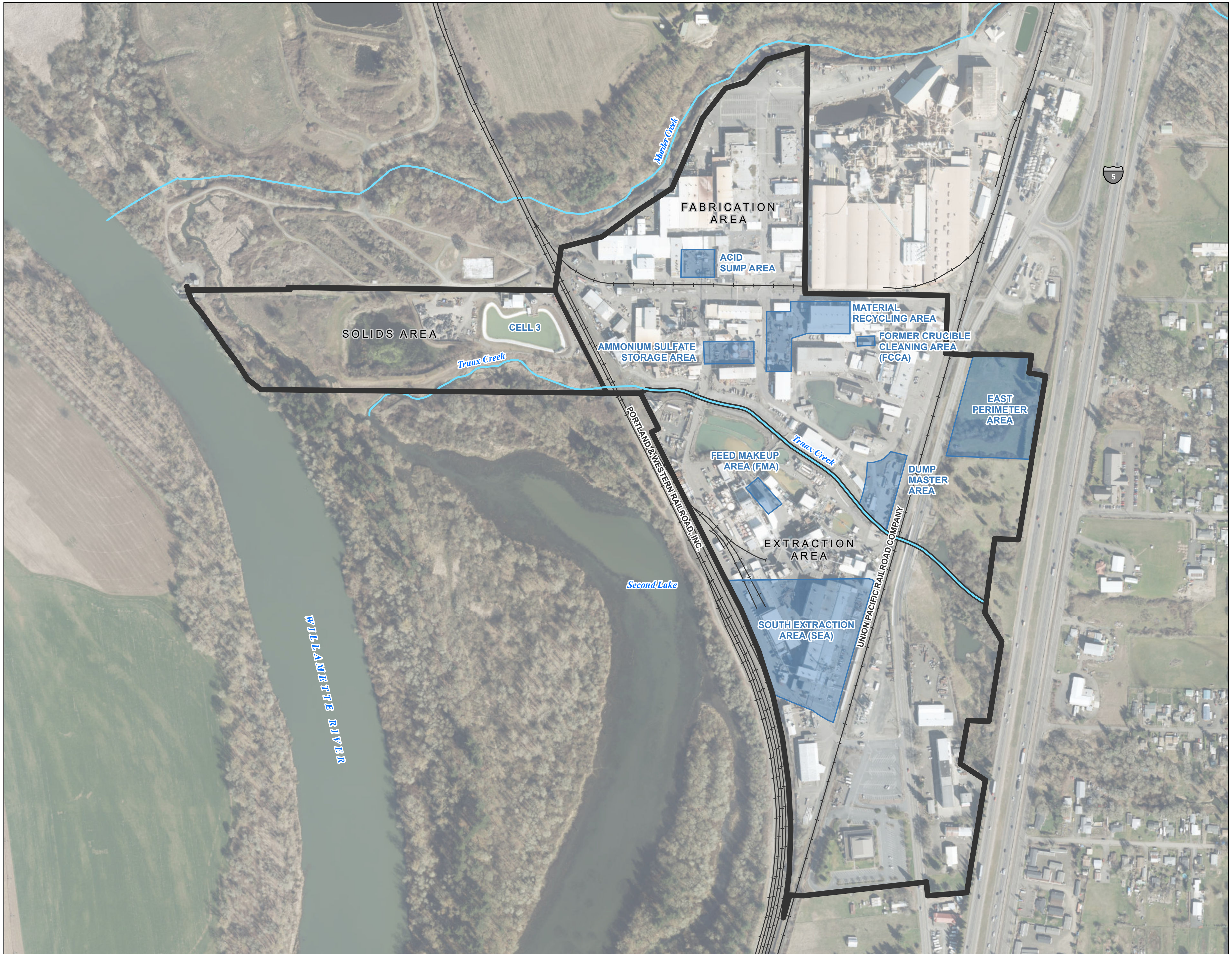
GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure1_Millersburg_Operations.mxd

# FIGURE 2

## Main Plant and Solids Area

*ATI Millersburg Operations, Oregon*




**LEGEND**

- Watercourse
- Boundary
- Investigation Subarea
- Railroad

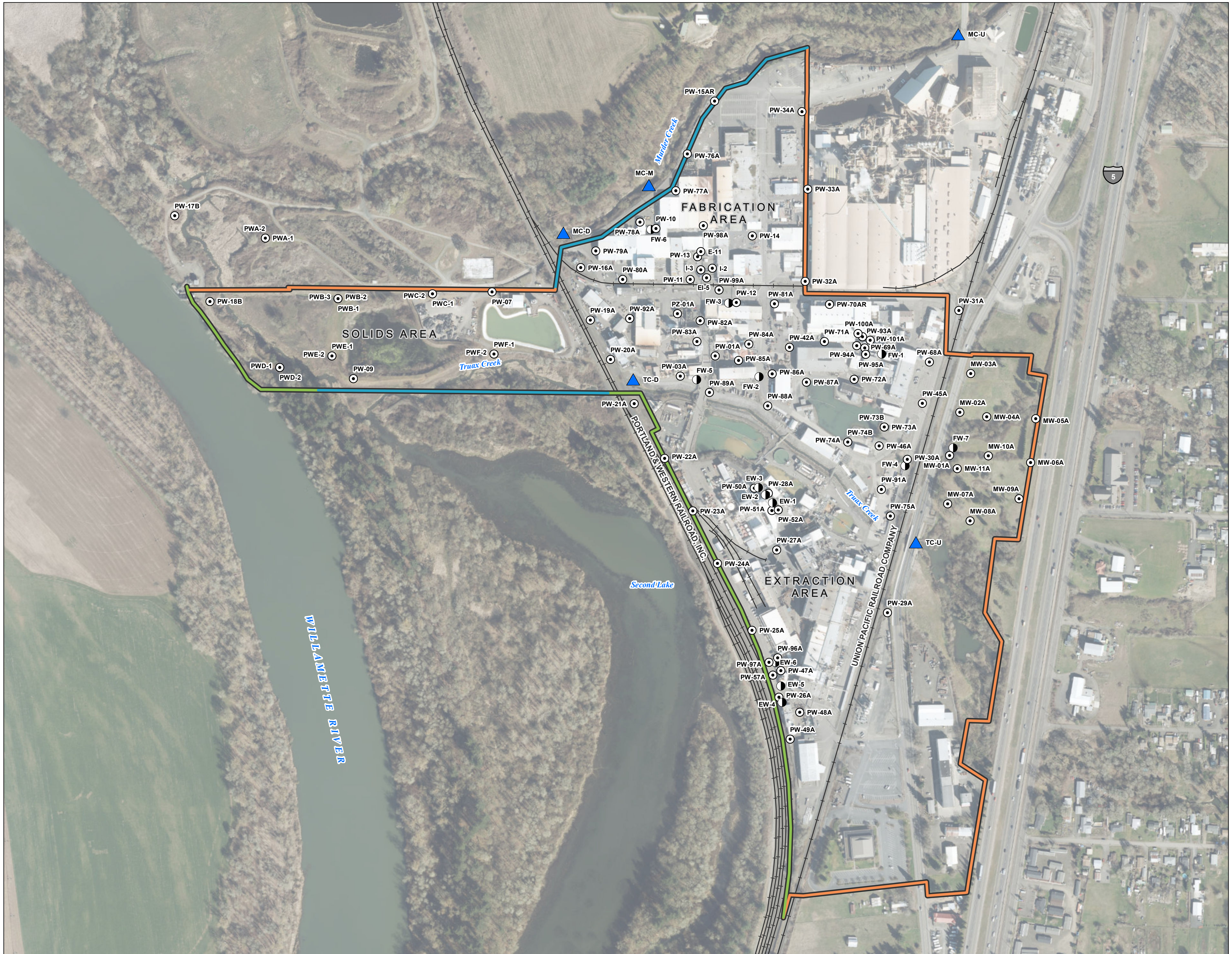
N

0 225 450 675
Feet

Date: March 31, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure2_Main_Plant_and_Solids_Area.mxd




# FIGURE 3

## Well and Surface Water Locations

*ATI Millersburg Operations, Oregon*

**LEGEND**

- Monitoring Well
- Extraction Well
- Surface Water Sample Location

**Property Boundary**

- AWQC for Aquatic Receptors
- AWQC for Human Health and Fish Consumption
- Groundwater Maximum Contaminant Levels (MCLs)

**All Other Features**

- Railroad

**NOTE**

AWQC: Ambient Water Quality Criteria

N

0 225 450 675

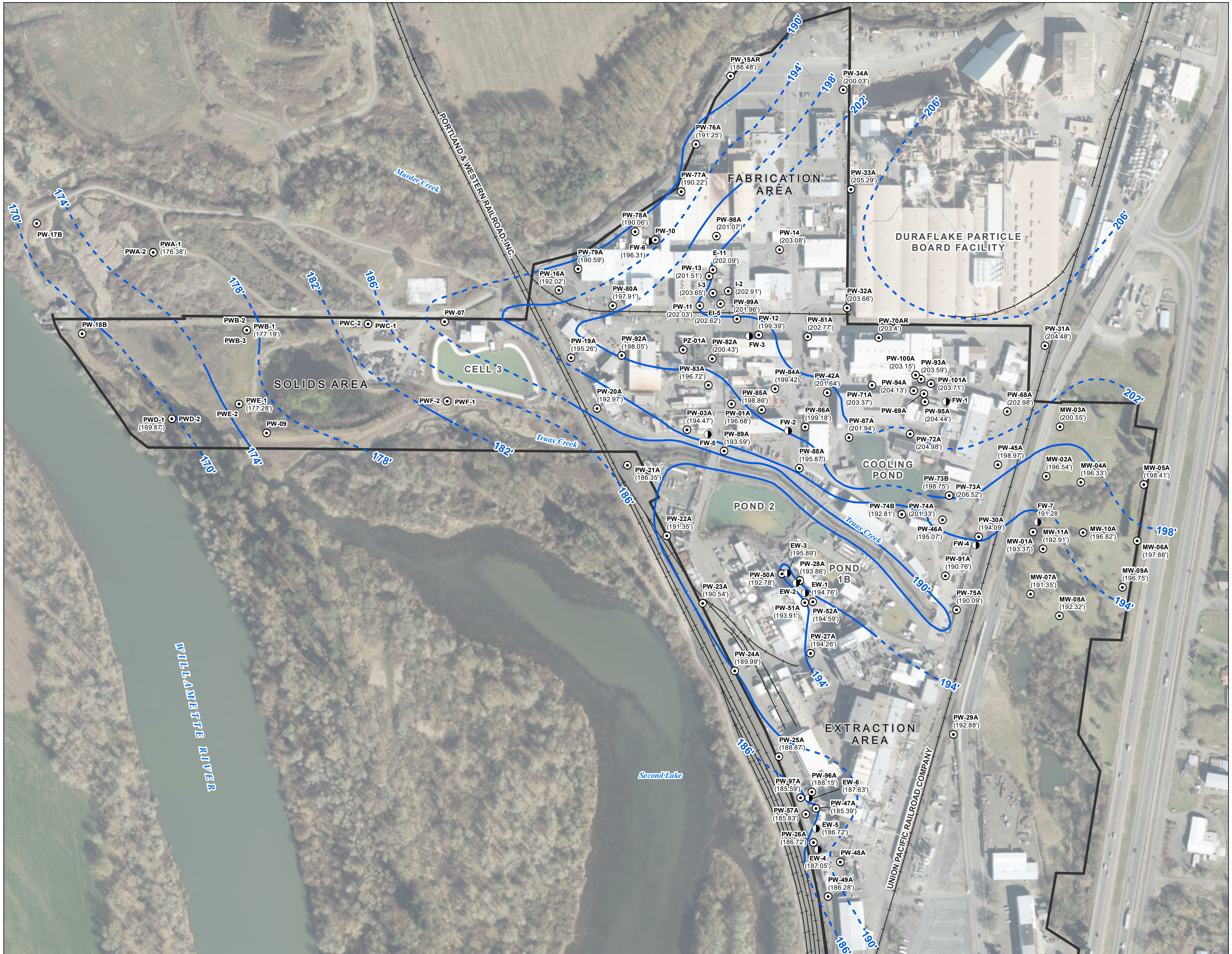
Feet

GSI Water Solutions, Inc.

Date: March 27, 2020

Data Sources: Linn Co., ESRI, Digiglobe 2018

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure3_Well_and_Surface_Water_Locations.mxd




# FIGURE 4

## Linn Gravel Groundwater Elevation Contours Fall 2019

*ATI Millersburg Operations, Oregon*

## LEGEND

- Extraction Well
- Monitoring Well
- Groundwater Elevation Contour (feet) (dashed where inferred)

**All Other Features**

- Property Boundary
- Railroad

## NOTES

1. Water levels not measured concurrently. Extraction Area wells measured on October 1st, Fabrication Area wells measured on September 30th, and Solids Area wells measured on August 15th.
2. The following Linn Gravel monitoring wells were not used for contouring:
   - FW-6 is used for contouring instead of PW-10 at EPA's request.
   - PW-48A is a shallow well. The bottom of the screen (19.6') is above the static water level at other nearby Extraction Area wells.
   - PW-69A is 3 feet from an outdoor freshwater spraying station that operates 24 hours a day and may leak through cracks in concrete pads.
   - PW-72A, PW-73A, and PW-74A are likely hydraulically connected to the cooling pond.
3. Cell 3 is lined. Operational levels are from 197' to 202.5'.
4. Pond elevations are variable and controlled by float switches Ponds discharge to publicly owned treatment work (POTW) wetlands.

AWQC: Ambient Water Quality Criteria

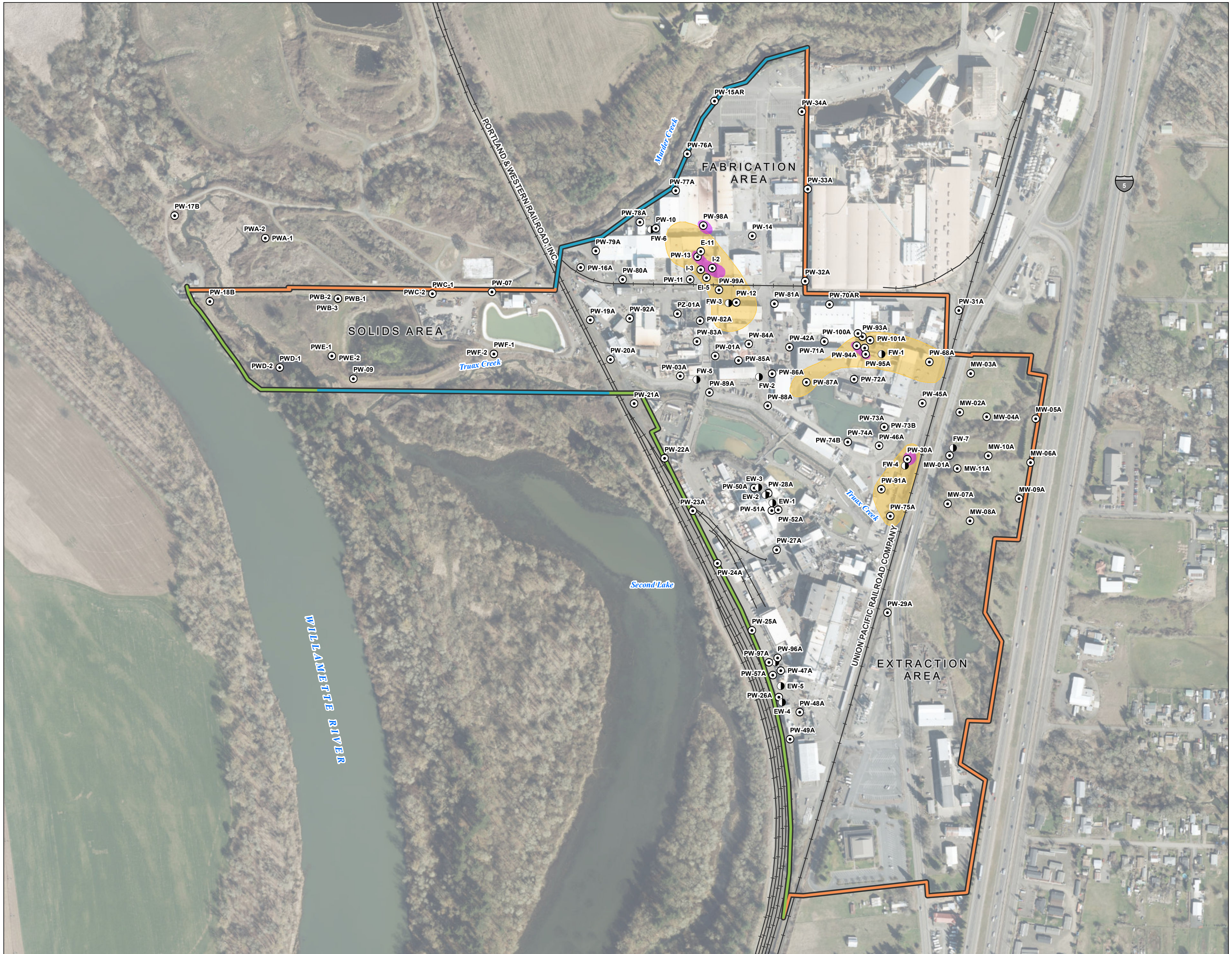
N

0 175 350 525
Feet

Date: March 31, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure4_Linn_Gravel_GW_Elevation_Contours.mxd




# FIGURE 5a

## TCA Distribution in Fall 2019 and 2000

*ATI Millersburg Operations, Oregon*

### LEGEND

- Monitoring Well
- Extraction Well
- Fall 2019 TCA Concentrations Above the Cleanup Level (200 µg/L)
- 2000 TCA Concentrations Above the Cleanup Level (200 µg/L)

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: 18,000 µg/L
- AWQC for Human Health and Fish Consumption, Standard: not established
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 200 µg/L

**All Other Features**

- Railroad

### NOTES

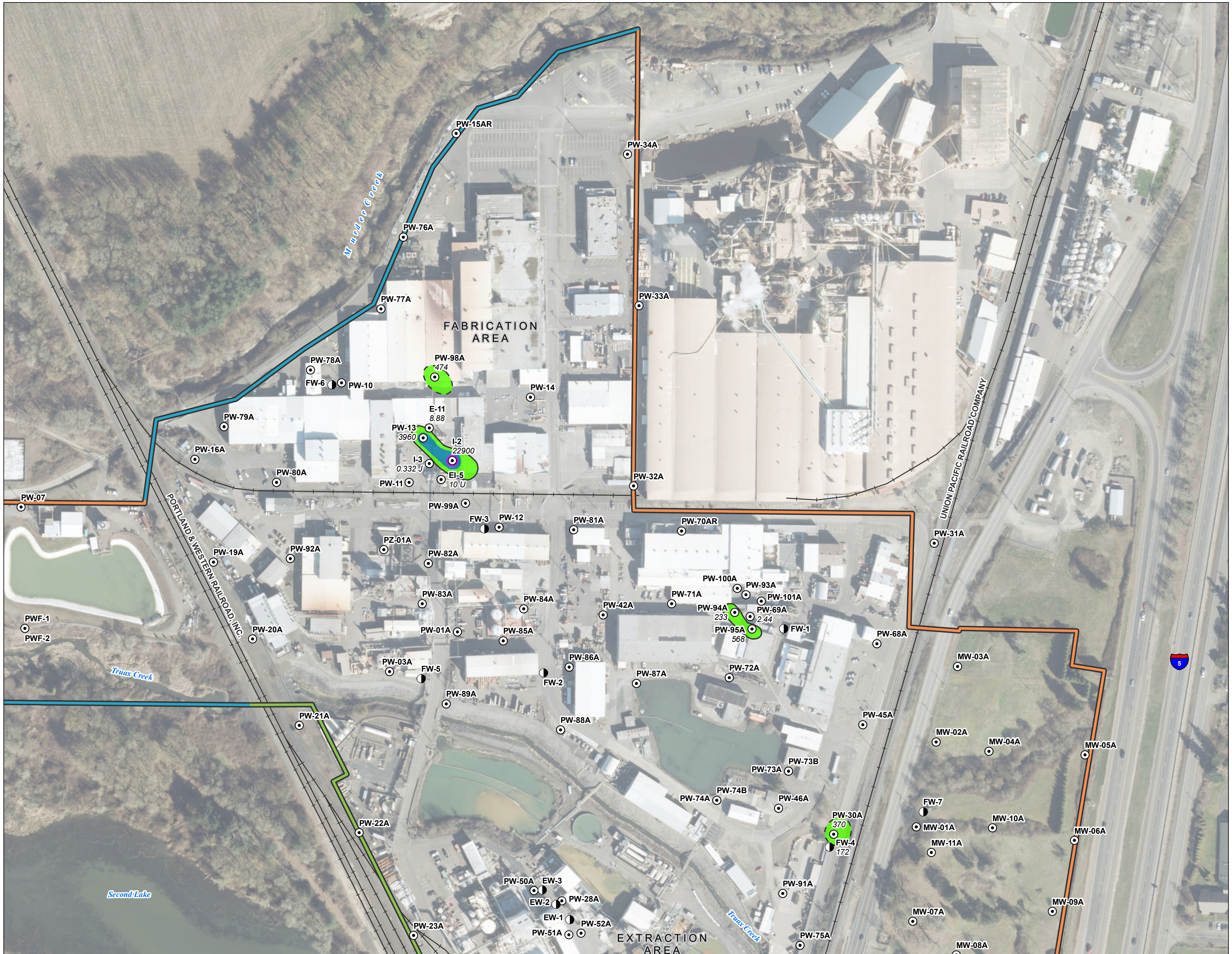
Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 200 µg/L

AWQC: Ambient Water Quality Criteria
TCA: 1,1,1-trichloroethane
µg/L: micrograms per liter

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure5a_TCA_Distribution_Fall_2019_and_2000.mxd




# FIGURE 5b

## TCA Isopleth in Fall 2019

*ATI Millersburg Operations, Oregon*

### LEGEND

- Monitoring Well
  *Fall 2019 TCA Concentration in µg/L*
- Extraction Well
  *Fall 2019 TCA Concentration in µg/L*

**Fall 2019 TCA Concentrations (µg/L)**

- 200
- 2,000
- 20,000
- TCA Concentration Boundary (dashed where inferred)

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: 18,000 µg/L
- AWQC for Human Health and Fish Consumption, Standard: not established
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 200 µg/L

**All Other Features**

- Railroad

### NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 200 µg/L

AWQC: Ambient Water Quality Criteria
TCA: 1,1,1-trichloroethane
U: not detected above reporting limit
J: estimate
µg/L: micrograms per liter

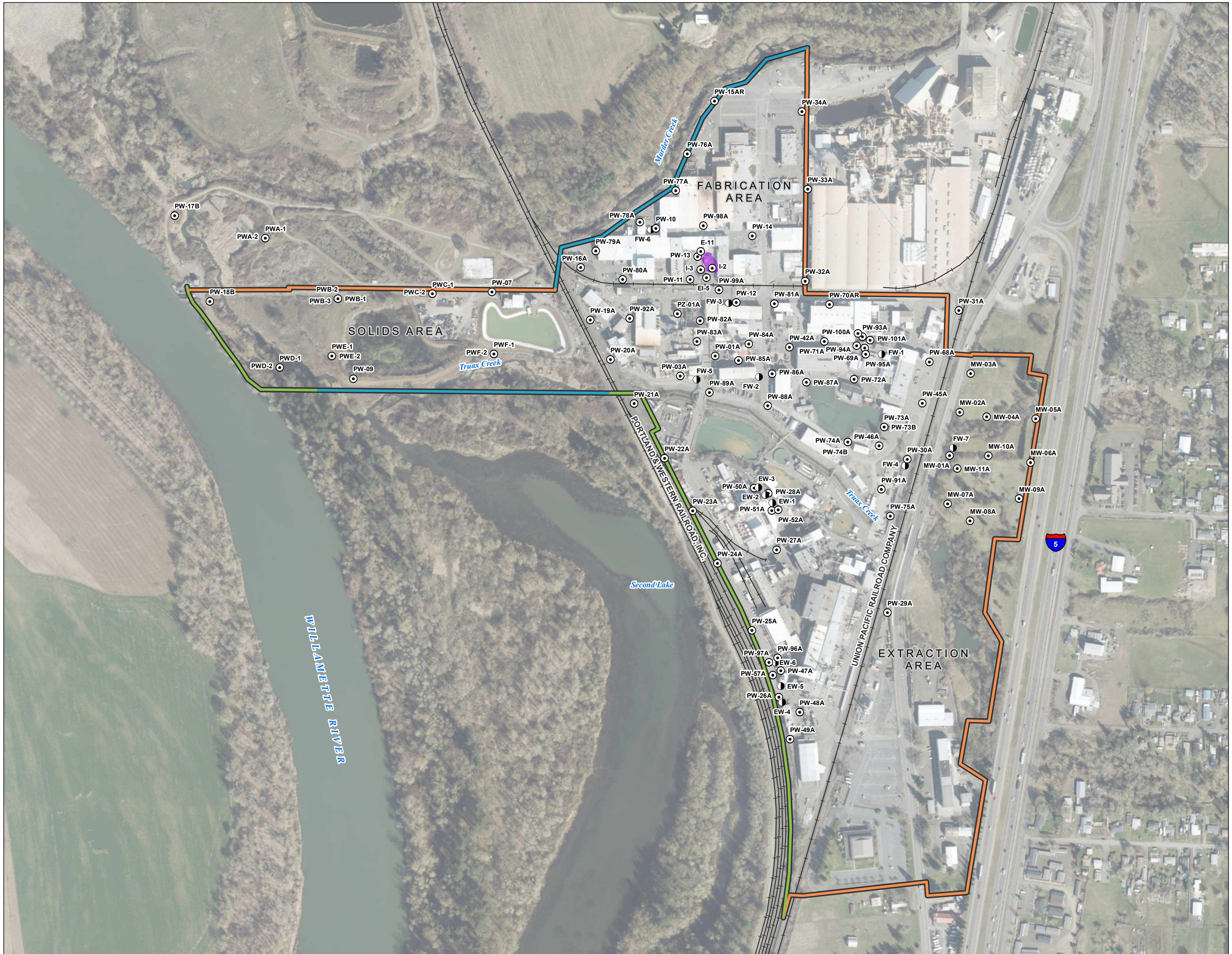
N

0 115 230 345
Feet

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure5b_TCA_Isopleth_Fall_2019.mxd




# FIGURE 6

## DCA Distribution in Fall 2019

*ATI Millersburg Operations, Oregon*

## LEGEND

- Monitoring Well
- Extraction Well
- Fall 2019 DCA Concentrations Above the Cleanup Level (3,700 µg/L); boundary dashed where inferred

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: not established
- AWQC for Human Health and Fish Consumption, Standard: not established
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 3,700 µg/L in Fabrication Area and 1,280 µg/L in Extraction Area

**All Other Features**

- Railroad

## NOTES

1. There were no DCA cleanup level exceedances in 2000.
2. Wells without a displayed concentration were below the cleanup level in Fall 2019.
3. Cleanup Level = 3,700 µg/L in the Fabrication Area and 1,280 µg/L in the Extraction Area.

AWQC: Ambient Water Quality Criteria
DCA: 1,1-dichloroethane
µg/L: micrograms per liter

N

0 225 450 675
Feet

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure6_DCA_Distribution_Fall_2019.mxd


# FIGURE 7

## PCE Distribution in Fall 2019 and 2000

*ATI Millersburg Operations, Oregon*

## LEGEND

- Monitoring Well
- Extraction Well
- Fall 2019 PCE Concentrations Above the Cleanup Level (5 µg/L)
- 2000 PCE Concentrations Above the Cleanup Level (5 µg/L)

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: 840 µg/L
- AWQC for Human Health and Fish Consumption, Standard: 0.24 µg/L
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 5 µg/L

**All Other Features**

- Railroad

## NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 5 µg/L

AWQC: Ambient Water Quality Criteria
PCE: tetrachloroethene
µg/L: micrograms per liter

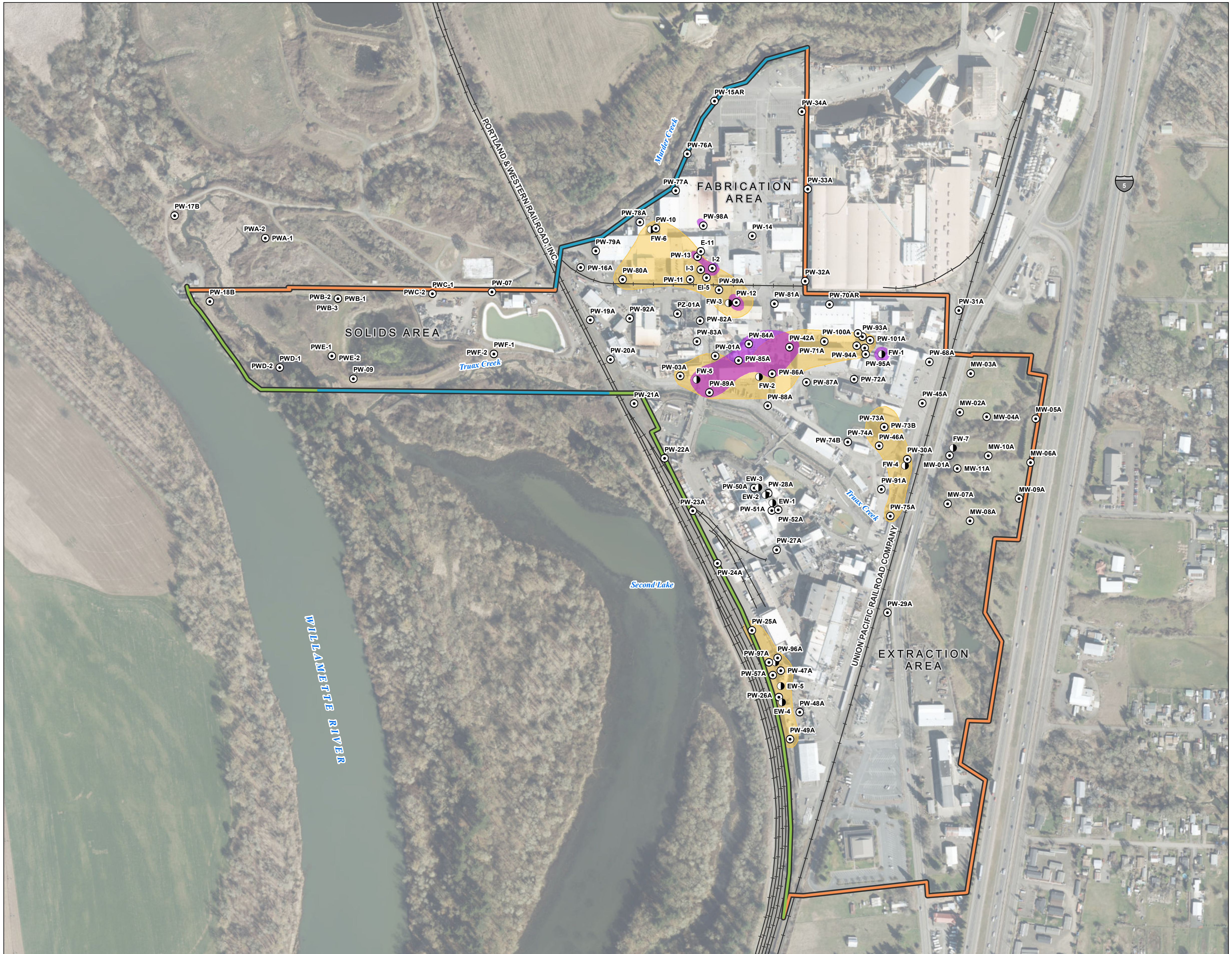
N

0 225 450 675
Feet

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure7_PCE_Distribution_Fall_2019_and_2000.mxd




# FIGURE 8a

## TCE Distribution in Fall 2019 and 2000

*ATI Millersburg Operations, Oregon*

### LEGEND

- Monitoring Well
- Extraction Well
- Fall 2019 TCE Concentrations Above the Cleanup Level (5 µg/L)
- 2000 TCE Concentrations Above the Cleanup Level (5 µg/L)

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: 21,900 µg/L
- AWQC for Human Health and Fish Consumption, Standard: 1.4 µg/L
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 5 µg/L

**All Other Features**

- Railroad

### NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 5 µg/L

AWQC: Ambient Water Quality Criteria
TCE: trichloroethene
µg/L: micrograms per liter

N

0 225 450 675
Feet

GSI Water Solutions, Inc.

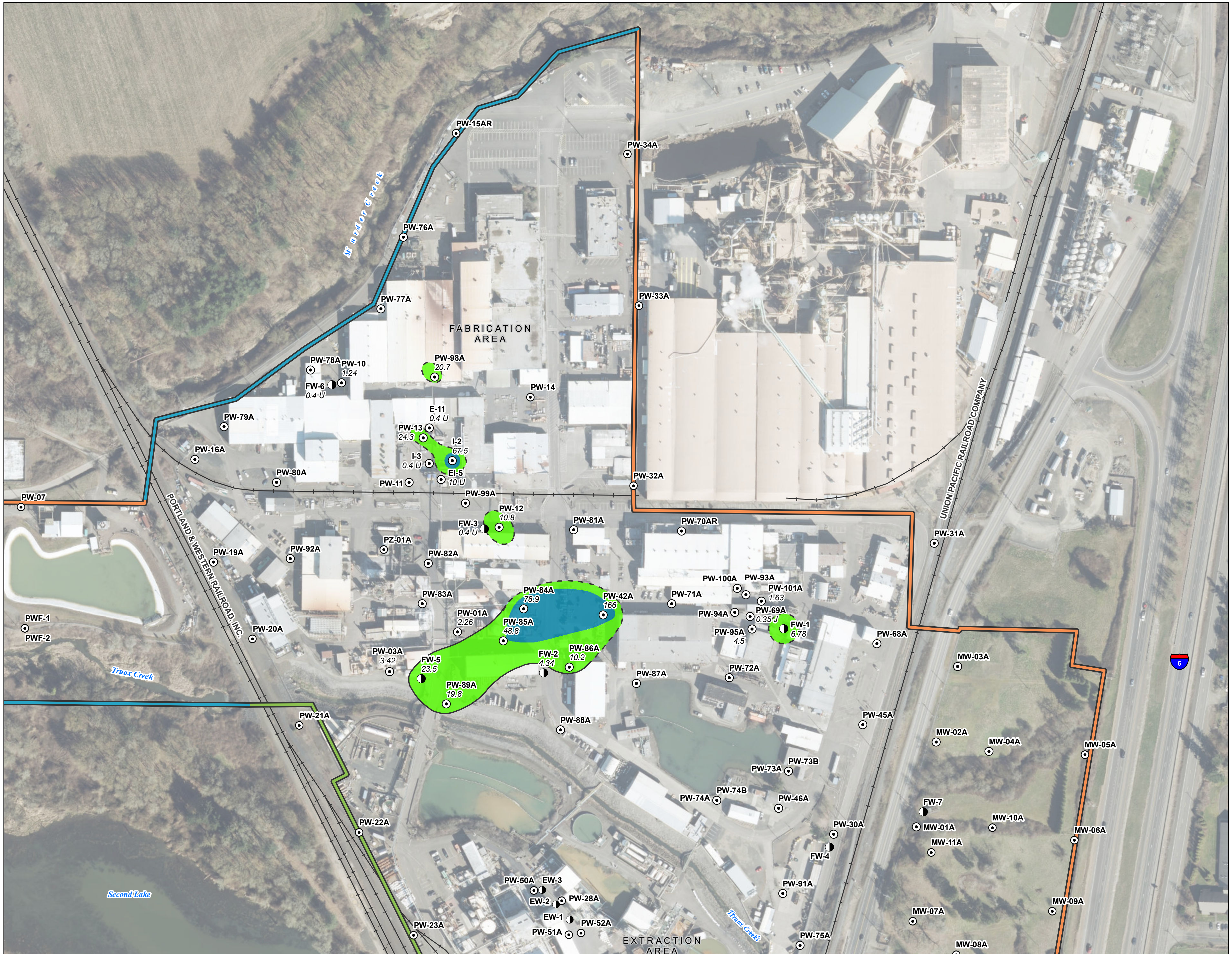
Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure8a_TCE_Distribution_Fall_2019_and_2000.mxd

# FIGURE 8b

## TCE Isopleth in Fall 2019

*ATI Millersburg Operations, Oregon*




## LEGEND

- Monitoring Well — *Fall 2019 TCE Concentration in µg/L*
- Extraction Well — *Fall 2019 TCE Concentration in µg/L*

**Fall 2019 TCE Concentrations (µg/L)**

- 5
- 50
- TCE Concentration Boundary (dashed where inferred)

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: 21,900 µg/L
- AWQC for Human Health and Fish Consumption, Standard: 1.4 µg/L
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 5 µg/L

**All Other Features**

- Railroad

## NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 5 µg/L

AWQC: Ambient Water Quality Criteria
TCE: trichloroethene
U: not detected above reporting limit
J: estimate
µg/L - micrograms per liter

N

0 115 230 345
Feet

GSI Water Solutions, Inc.

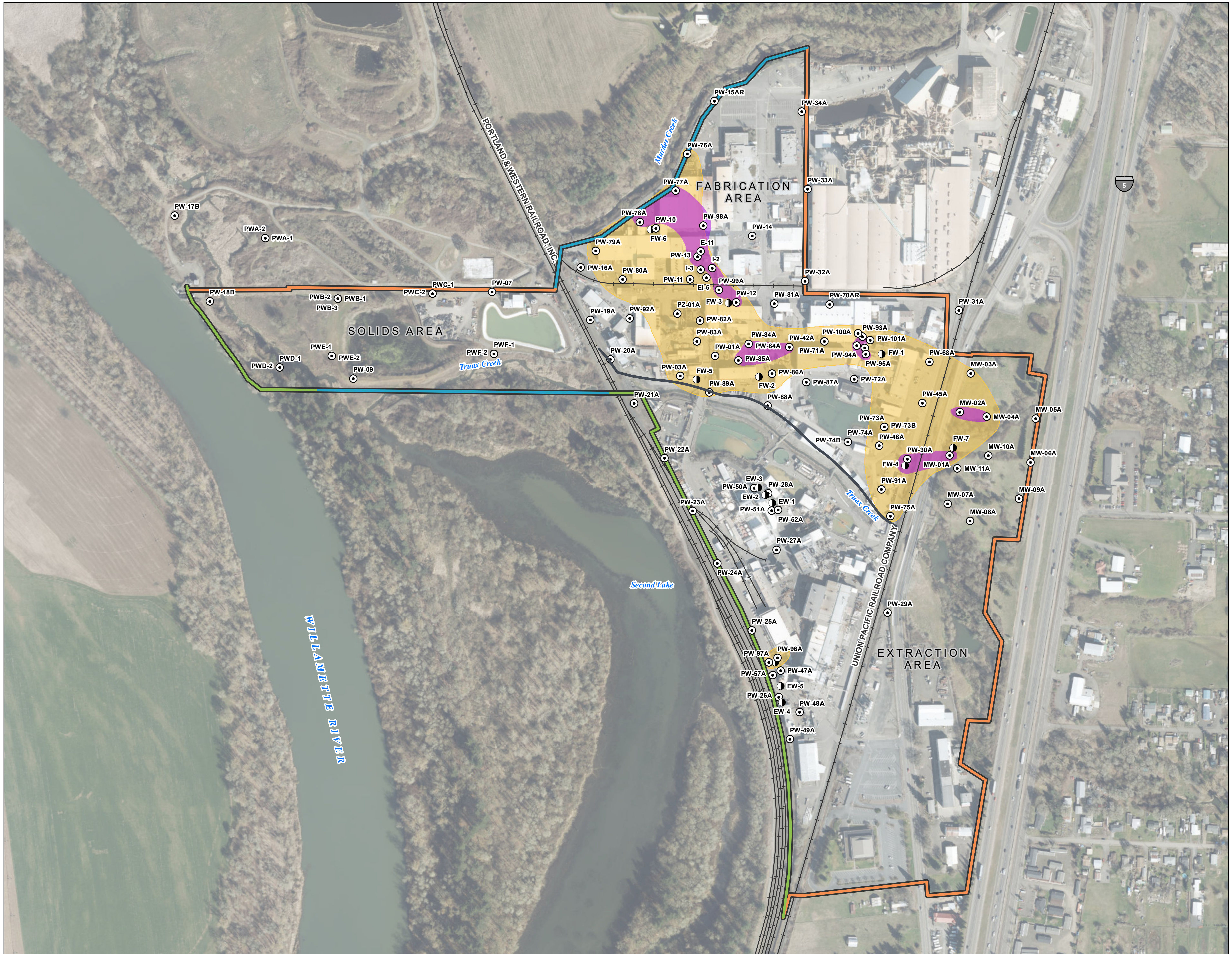
Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure8b_TCE_Isopleth_Fall_2019.mxd

# FIGURE 9a

## DCE Distribution in Fall 2019 and 2000

*ATI Millersburg Operations, Oregon*




## LEGEND

- Monitoring Well
- Extraction Well
- Fall 2019 DCE Concentrations Above the Cleanup Level (7 µg/L)
- 2000 DCE Concentrations Above the Cleanup Level (7 µg/L)

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: 11,600 µg/L
- AWQC for Human Health and Fish Consumption, Standard: 230 µg/L
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 7 µg/L

**All Other Features**

- Railroad

## NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 7 µg/L

AWQC: Ambient Water Quality Criteria
DCE: 1,1-dichloroethene
µg/L: micrograms per liter

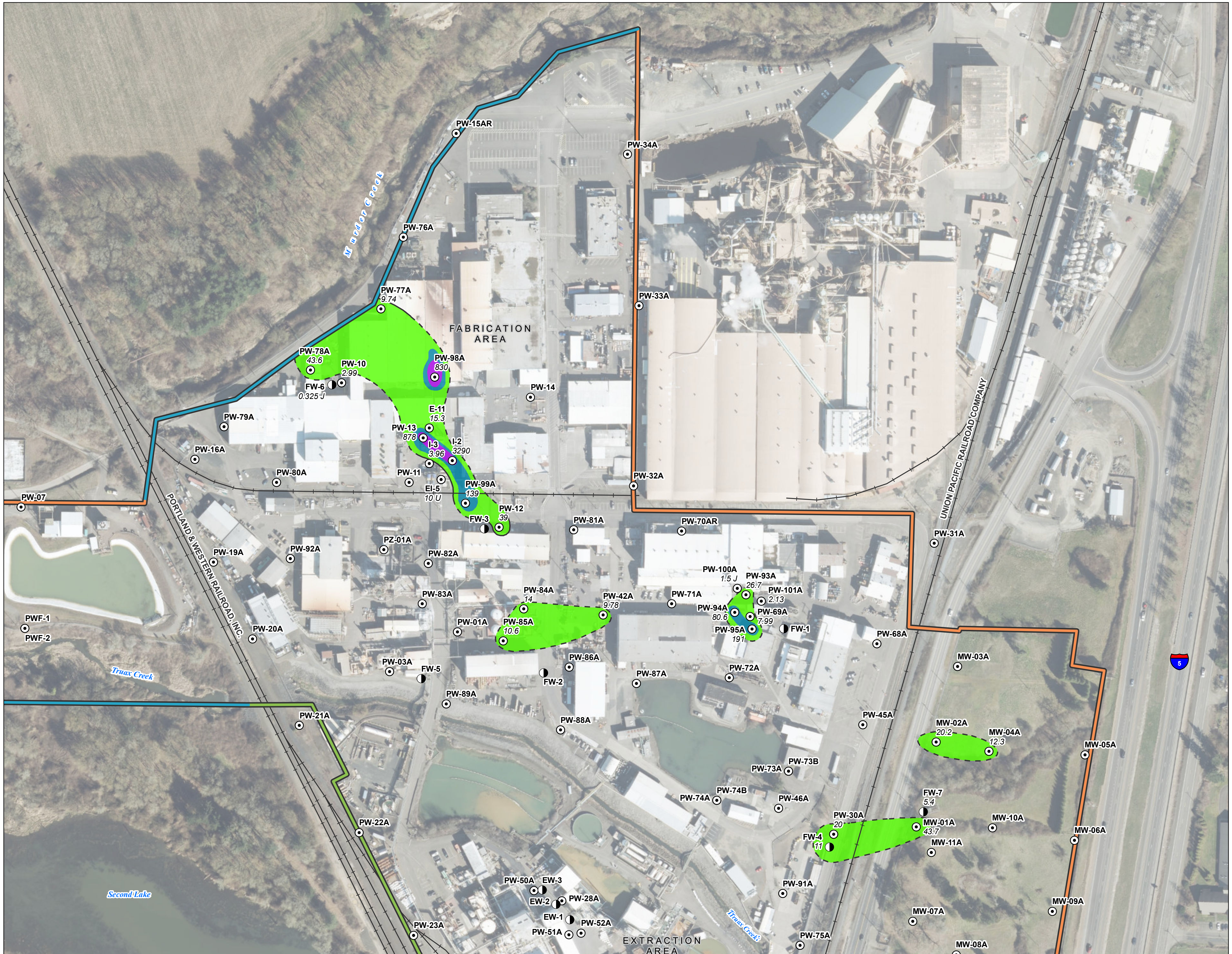
N

0 225 450 675
Feet

GSI Water Solutions, Inc.

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure9a_DCE_Distribution_Fall_2019_and_2000.mxd




# FIGURE 9b

## DCE Isopleth in Fall 2019

*ATI Millersburg Operations, Oregon*

### LEGEND

Monitoring Well
*Fall 2019 DCE Concentration in µg/L*

Extraction Well
*Fall 2019 DCE Concentration in µg/L*

**Fall 2019 DCE Concentrations (µg/L)**

7

70

700

DCE Concentration Boundary (dashed where inferred)

**Property Boundary**

AWQC for Aquatic Receptors, Standard: 11,600 µg/L

AWQC for Human Health and Fish Consumption, Standard: 230 µg/L

Groundwater Maximum Contaminant Levels (MCLs), Standard: 7 µg/L

**All Other Features**

Railroad

### NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 7 µg/L

AWQC: Ambient Water Quality Criteria
DCE: 1,1-dichloroethene
U: not detected above reporting limit
J: estimate
µg/L: micrograms per liter

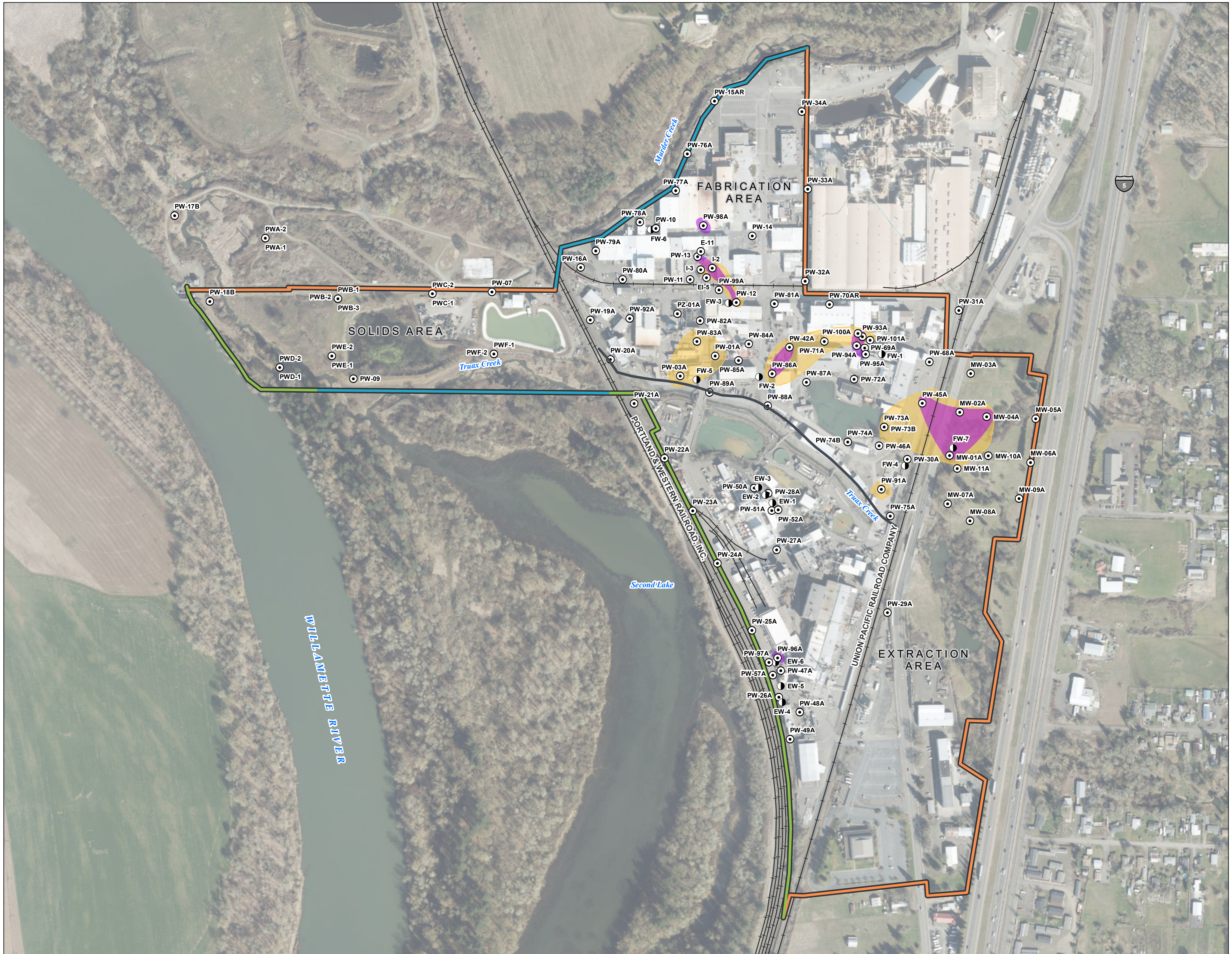
N

0 115 230 345
Feet

GSI Water Solutions, Inc.

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure9b_DCE_Isopleth_Fall_2019.mxd




# FIGURE 10a

## VC Distribution in Fall 2019 and 2000

*ATI Millersburg Operations, Oregon*

### LEGEND

Monitoring Well

Extraction Well

Fall 2019 VC Concentrations Above the Cleanup Level (2 µg/L)

2000 VC Concentrations Above the Cleanup Level (2 µg/L)

**Property Boundary**

AWQC for Aquatic Receptors, Standard: not established

AWQC for Human Health and Fish Consumption, Standard: 0.023 µg/L

Groundwater Maximum Contaminant Levels (MCLs), Standard: 2 µg/L

**All Other Features**

Railroad

### NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 2 µg/L

AWQC: Ambient Water Quality Criteria
VC: Vinyl Chloride
µg/L: micrograms per liter

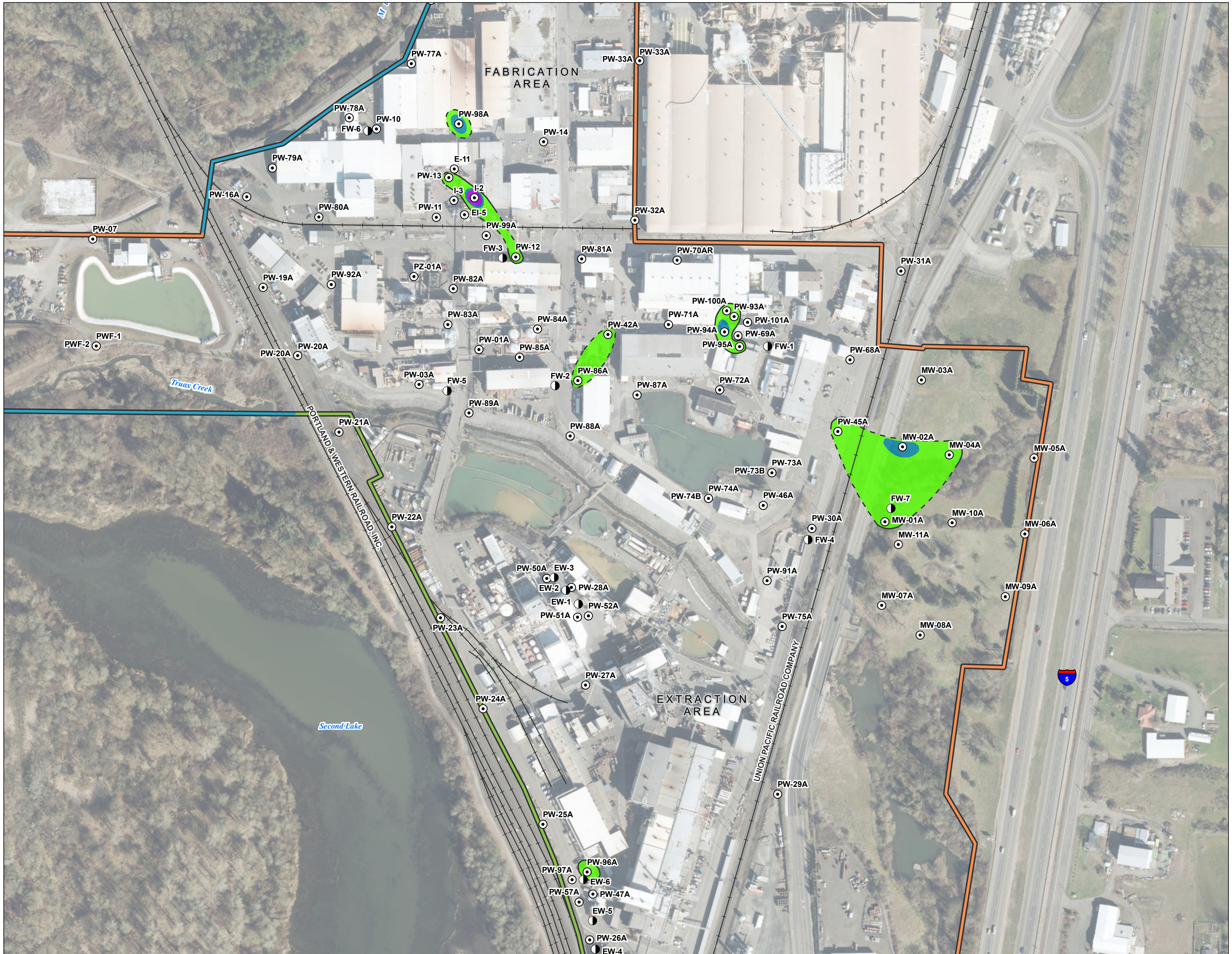
N

0 225 450 675
Feet

Date: March 30, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure10a_VC_Distribution_2000_2019.mxd




# FIGURE 10b

## VC Isopleth in Fall 2019

*ATI Millersburg Operations, Oregon*

## LEGEND

Monitoring Well
*Fall 2019 VC Concentration in µg/L*

Extraction Well
*Fall 2019 VC Concentration in µg/L*

**Fall 2019 VC Concentrations (µg/L)**

- 2
- 20
- 200

VC Concentration Boundary (dashed where inferred)

**Property Boundary**

AWQC for Aquatic Receptors, Standard: not established

AWQC for Human Health and Fish Consumption, Standard: 0.023 µg/L

Groundwater Maximum Contaminant Levels (MCLs), Standard: 2 µg/L

**All Other Features**

Railroad

## NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 2 µg/L

AWQC: Ambient Water Quality Criteria
VC: Vinyl Chloride
U: not detected above reporting limit
J: estimate
µg/L: micrograms per liter

N

0 115 230 345
Feet

Date: March 30, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure10b_VC_Isopleth_Fall_2019.mxd

# FIGURE 11

## Ammonium Distribution in Fall 2019 and 2000

*ATI Millersburg Operations, Oregon*


### LEGEND

- Monitoring Well
- Extraction Well
- Fall 2019 Ammonium Concentrations Above the Cleanup Level (250 mg/L)
- 2000 Ammonium Concentrations Above the Cleanup Level (250 mg/L)

**Property Boundary**

- AWQC for Aquatic Receptors: Standard function based value dependent on pH and temperature.
- AWQC for Human Health and Fish Consumption, Standard: not established
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 250 mg/L

**All Other Features**

- Railroad

### NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 250 mg/L

AWQC: Ambient Water Quality Criteria
mg/L: milligrams per liter

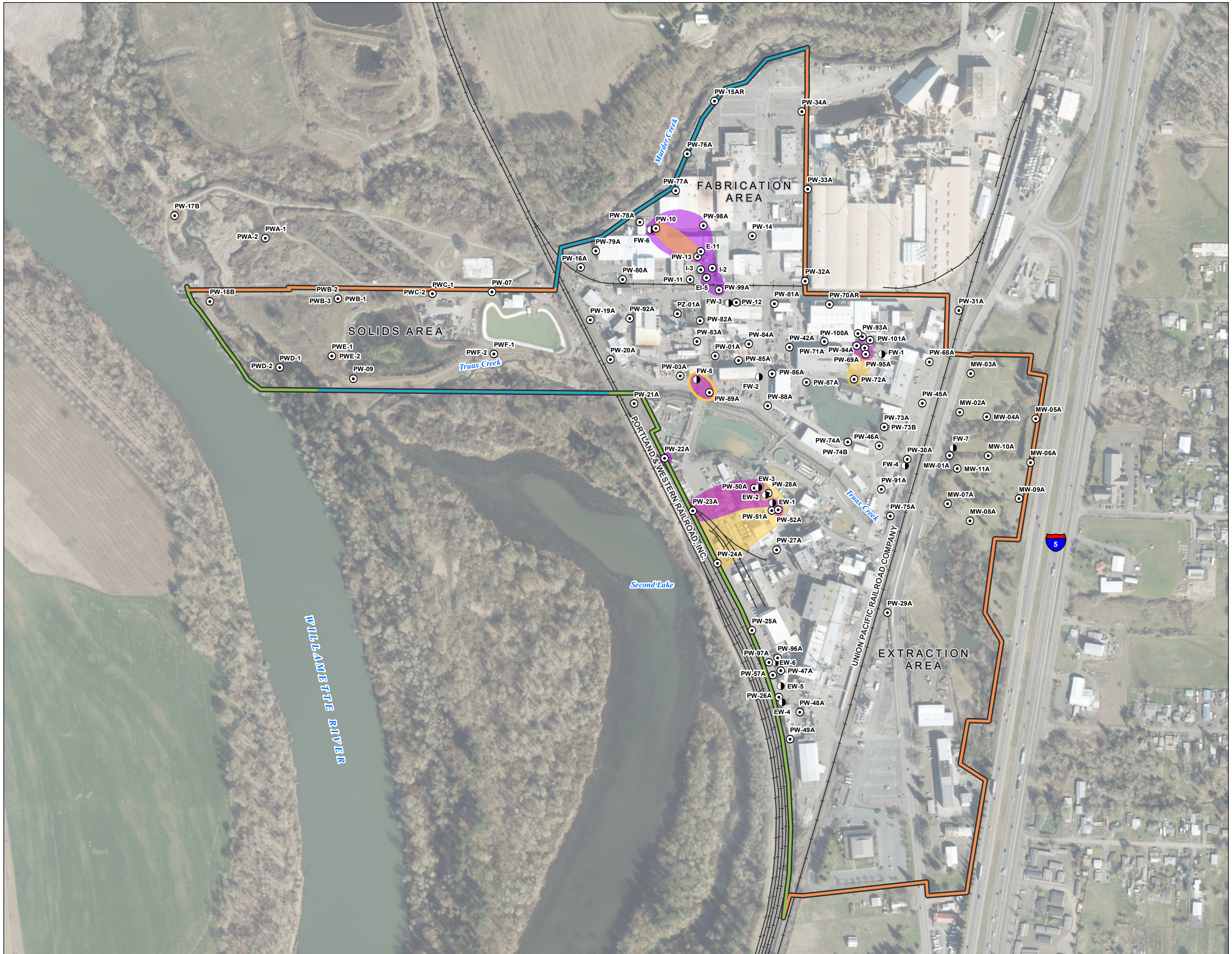
N

0 225 450 675
Feet

GSI Water Solutions, Inc.

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure11_Ammonium_Distribution_Fall_2019_and_2000.mxd




# FIGURE 12

## Fluoride Distribution in Fall 2019 and 2000

*ATI Millersburg Operations, Oregon*

### LEGEND

- Monitoring Well
- Extraction Well
- Fall 2019 Fluoride Concentrations Above the Cleanup Level (4 mg/L)
- 2000 Fluoride Concentrations Above the Cleanup Level (4 mg/L)

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: not established
- AWQC for Human Health and Fish Consumption, Standard: not established
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 4 mg/L

**All Other Features**

- Railroad

### NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 4 mg/L

AWQC: Ambient Water Quality Criteria
mg/L: milligrams per liter

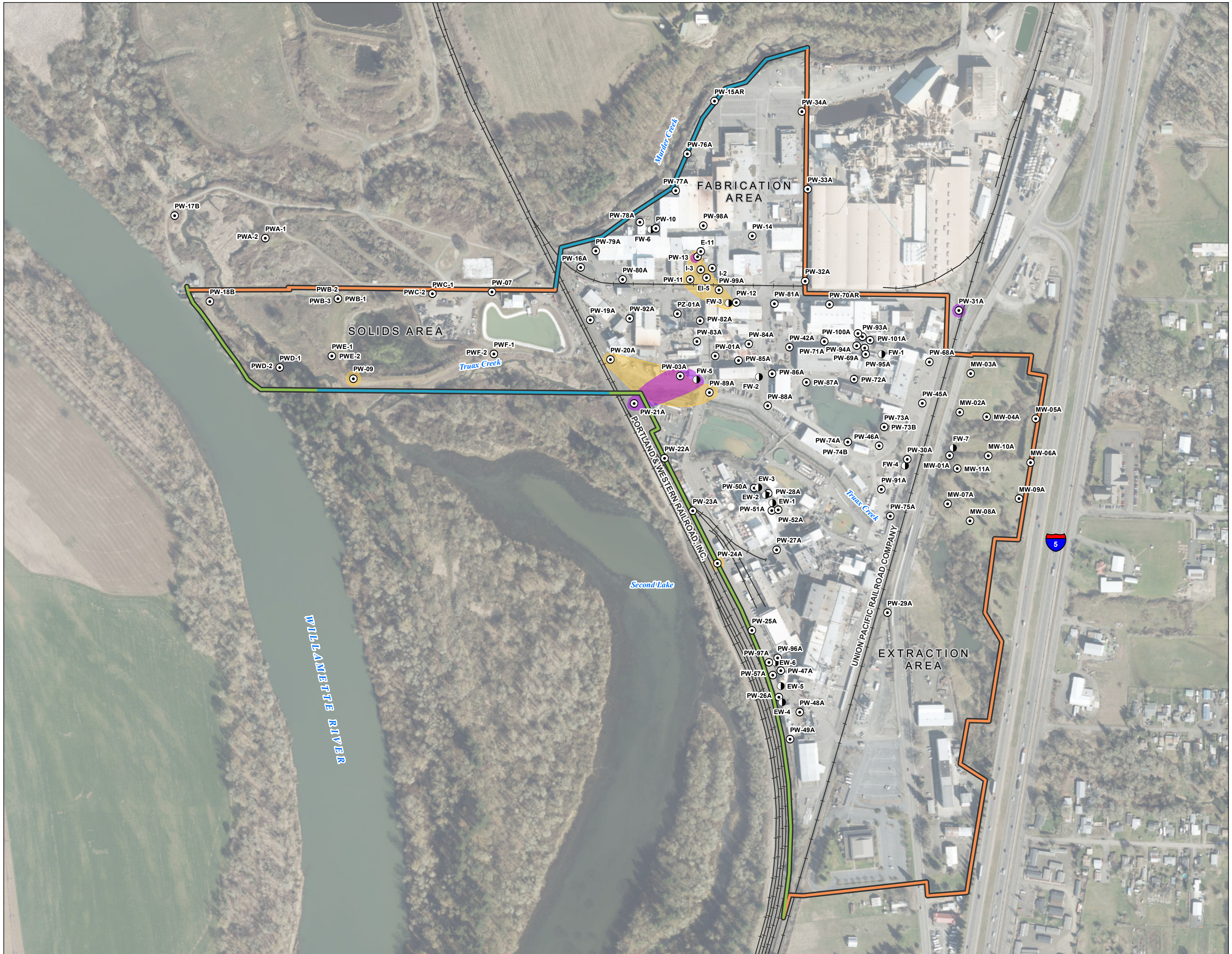
N

0 225 450 675
Feet

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure12_Fluoride_Distribution_Fall_2019_and_2000.mxd




# FIGURE 13

## Nitrate Distribution in Fall 2019 and 2000

*ATI Millersburg Operations, Oregon*

## LEGEND

- Monitoring Well
- Extraction Well
- Fall 2019 Nitrate Concentrations Above the Cleanup Level (10 mg/L)
- 2000 Nitrate Concentrations Above the Cleanup Level (10 mg/L)

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: not established
- AWQC for Human Health and Fish Consumption, Standard: not established
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 10 mg/L

**All Other Features**

- Railroad

## NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 10 mg/L

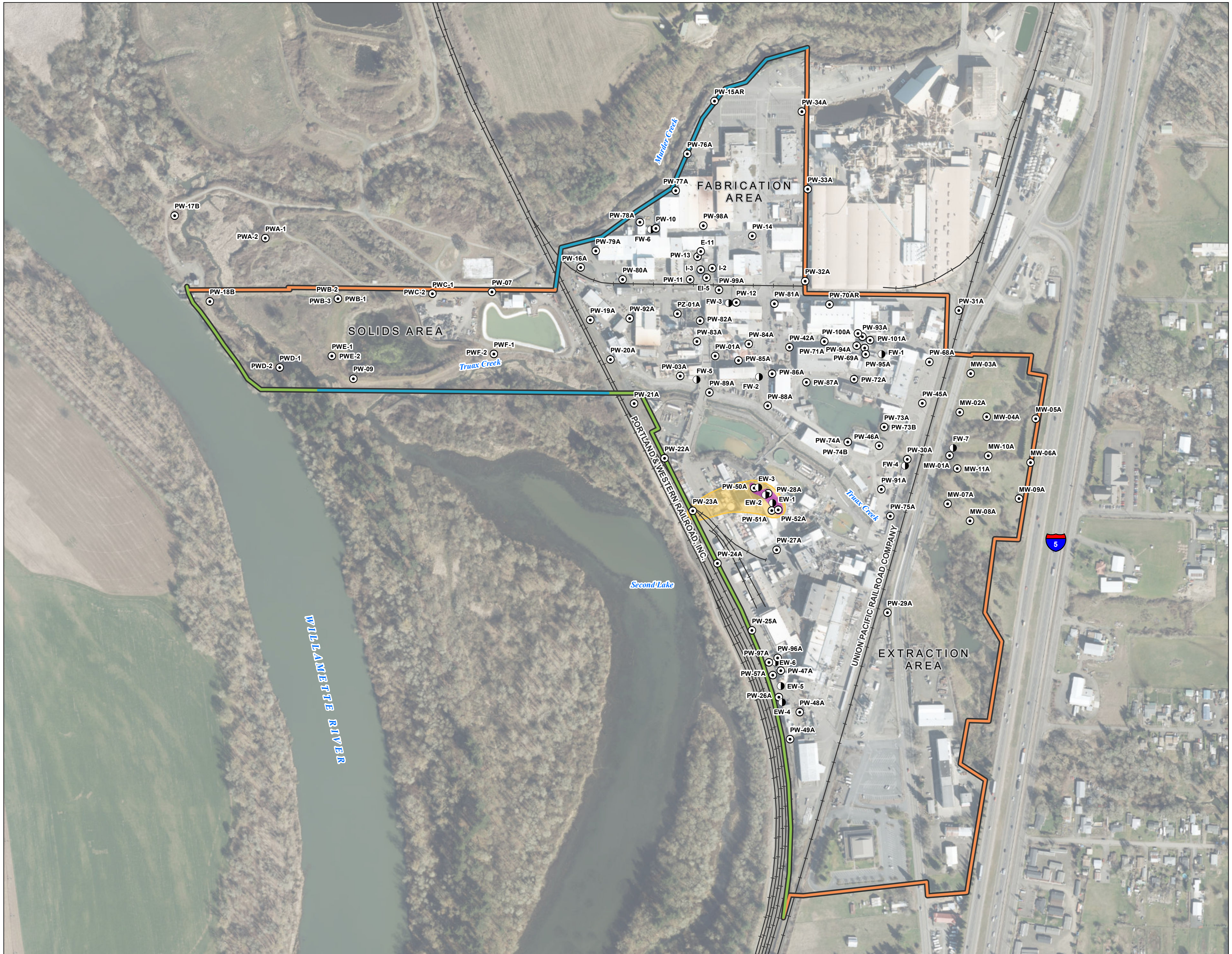
AWQC: Ambient Water Quality Criteria
mg/L: milligrams per liter

N

0 225 450 675
Feet

GSI Water Solutions, Inc.

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018




# FIGURE 14

## Radium-226/228 Distribution in Fall 2019 and 2000

*ATI Millersburg Operations, Oregon*

### LEGEND

- Monitoring Well
- Extraction Well
- Fall 2019 Radium-226/228 Concentrations Above the Cleanup Level (5 pCi/L)
- 2000 Radium-226/228 Concentrations Above the Cleanup Level (5 pCi/L)

**Property Boundary**

- AWQC for Aquatic Receptors, Standard: not established
- AWQC for Human Health and Fish Consumption, Standard: not established
- Groundwater Maximum Contaminant Levels (MCLs), Standard: 5 pCi/L

**All Other Features**

- Railroad

### NOTES

Wells without a displayed concentration were below the cleanup level in Fall 2019.
Cleanup Level = 5 pCi/L

AWQC: Ambient Water Quality Criteria
pCi/L: picocuries per liter

N

0 225 450 675
Feet

Date: March 25, 2020
Data Sources: Linn Co., ESRI, Digiglobe 2018

GSI Water Solutions, Inc.

Document Path: Y:\0168_Wah_Chang\Source_Figures\028_2019\Annual_Report\Comprehensive_2019\Figure14_Radium_Distribution_Fall_2019_and_2000.mxd

# APPENDIX A

Remedial Investigation and Feasibility Study Cross Sections
(CH2M Hill, 1993, pp. 4-59–4-66)

08-24-92

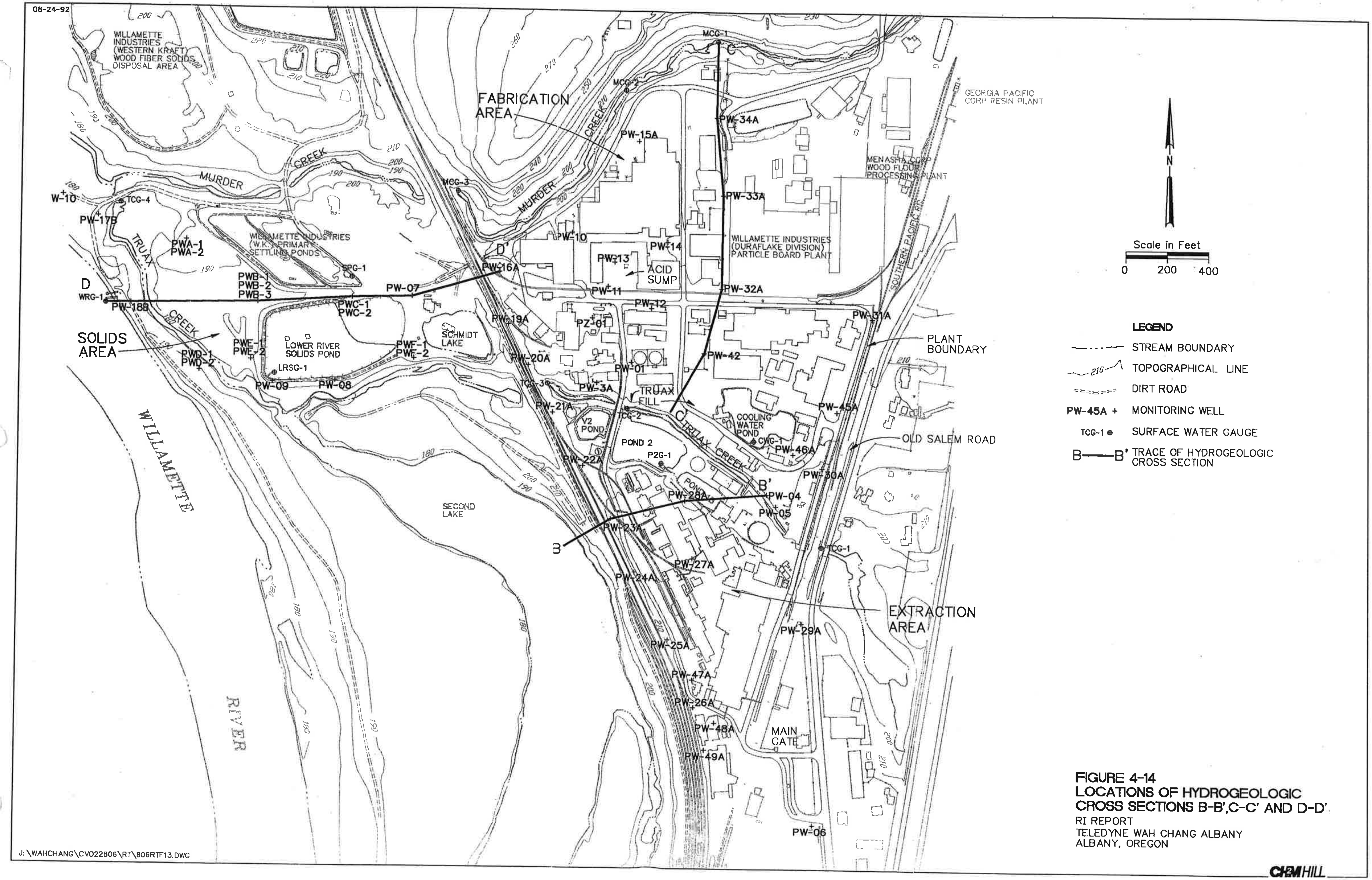
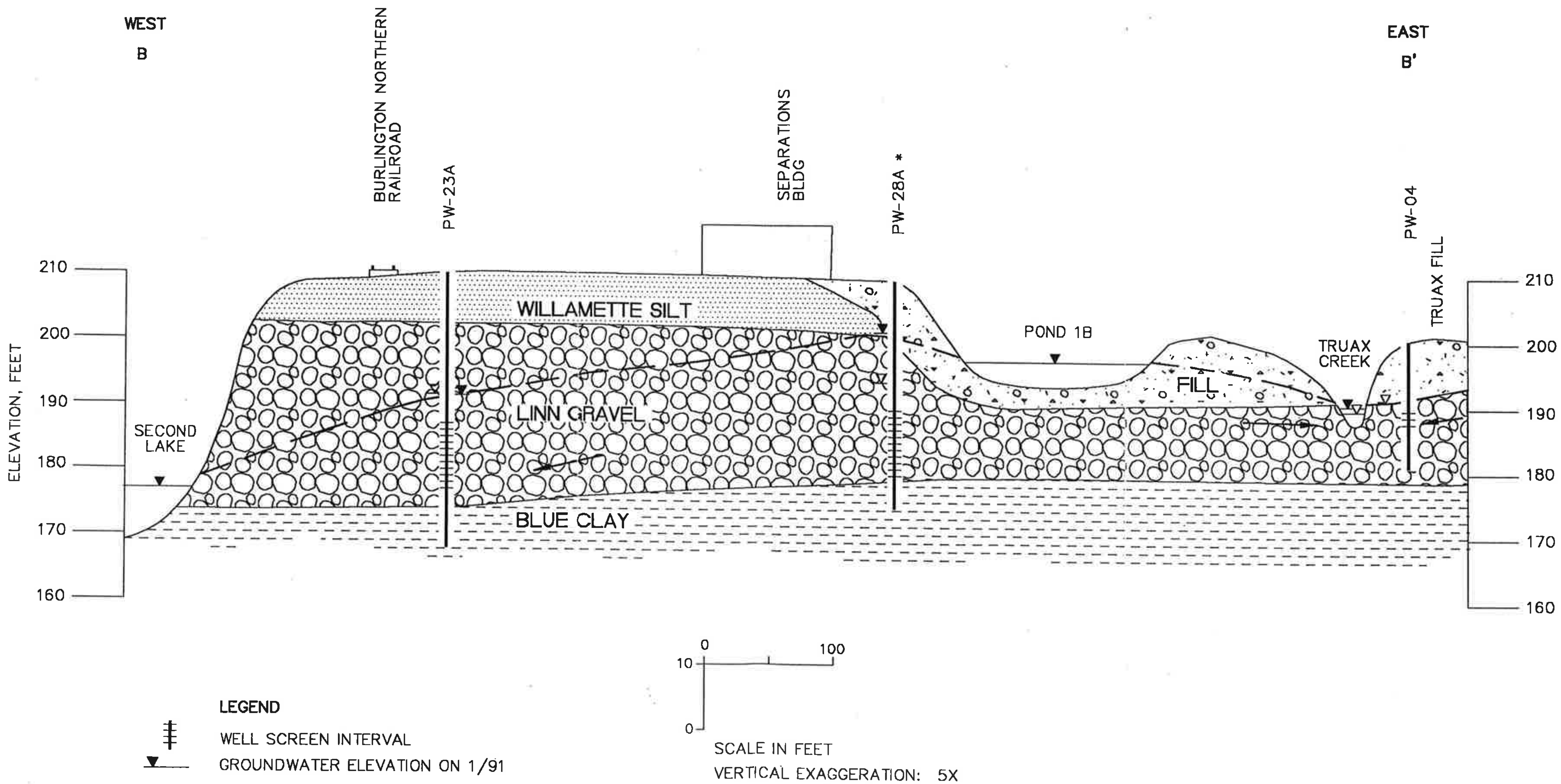



**FIGURE 4-14**
**LOCATIONS OF HYDROGEOLOGIC CROSS SECTIONS B-B',C-C' AND D-D'**
RI REPORT
TELEDYNE WAH CHANG ALBANY
ALBANY, OREGON

J:\WAHCHANG\CVO22806\RT\806RTF13.DWG

CH2M HILL

08-26-92




**LEGEND**

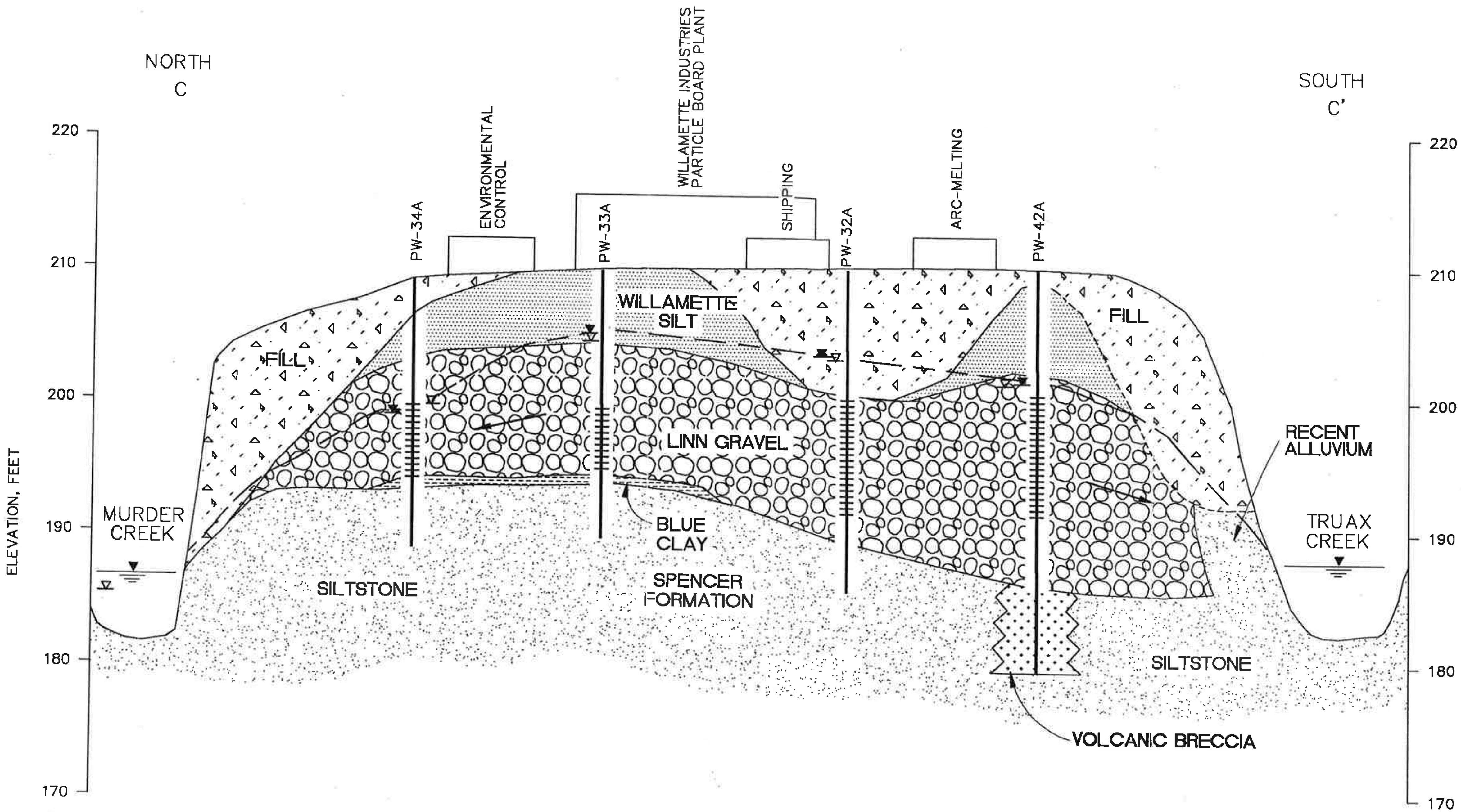
- WELL SCREEN INTERVAL
- GROUNDWATER ELEVATION ON 1/91
- GROUNDWATER ELEVATION ON 10/91
- SHALLOW GROUNDWATER TABLE ON 1/91
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- * WATER LEVEL ELEVATIONS INCONSISTENT WITH OTHER WELLS DUE TO PERIODS OF GROUNDWATER MOUNDING AND PUMPING

**FIGURE 4-15**
**EXTRACTION AREA CONCEPTUAL HYDROGEOLOGIC CROSS SECTION B-B'**
RI REPORT
TELEDYNE WAH CHANG ALBANY
ALBANY, OREGON

J: \WAHCHANG\CVO22806\RT\806RTF14.DWG

CH2M HILL

09-15-92




**LEGEND**

- WELL SCREEN INTERVAL
- GROUNDWATER ELEVATION ON 1/91
- GROUNDWATER ELEVATION ON 10/91
- SHALLOW GROUNDWATER TABLE ON 1/91
- ESTIMATED CONTACT LOCATION
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW

0 100
10
0

SCALE IN FEET
VERTICAL EXAGGERATION = 20X

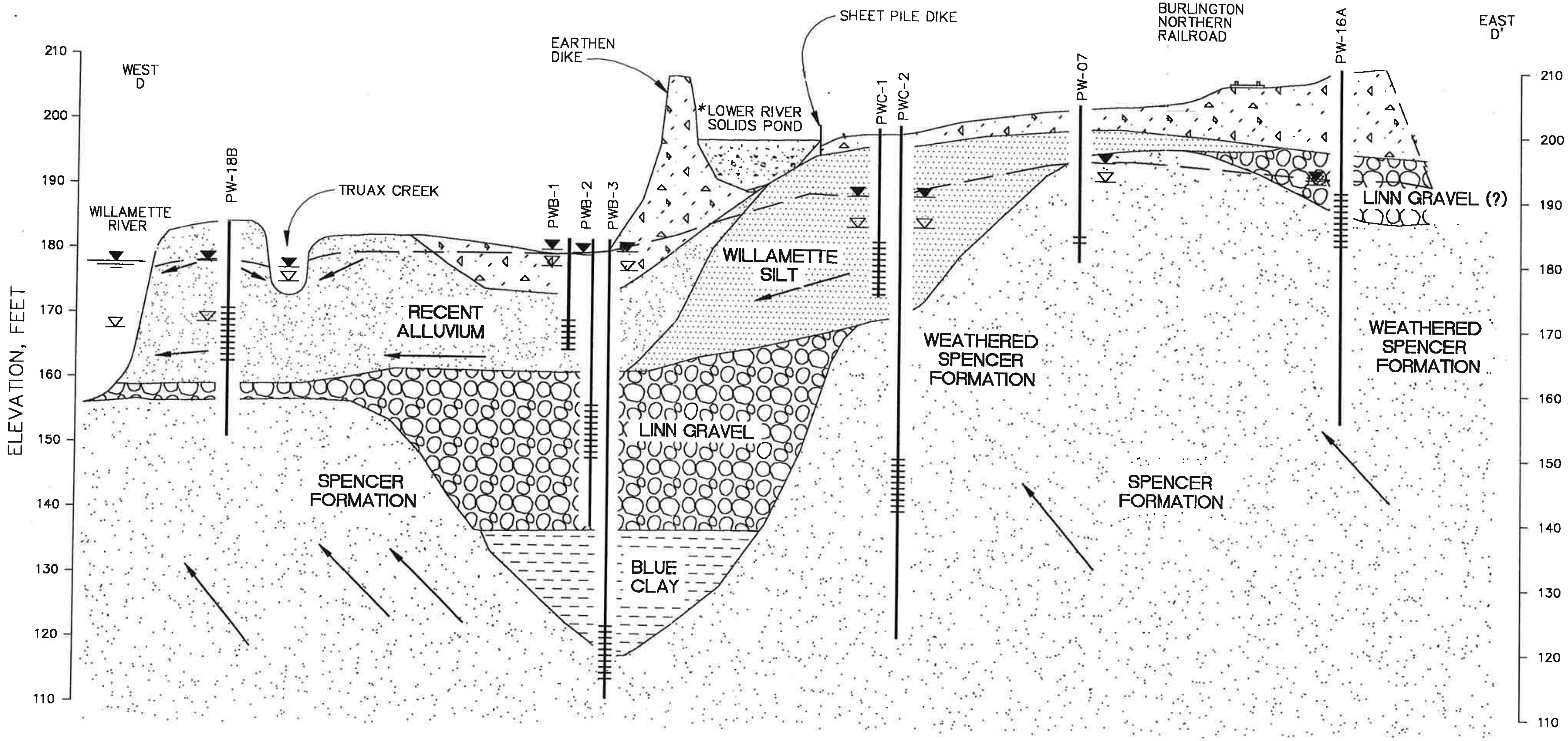
**FIGURE 4-16**
**FABRICATION AREA CONCEPTUAL HYDROGEOLOGIC CROSS SECTION C-C'**
RI REPORT
TELEDYNE WAH CHANG ALBANY
ALBANY, OREGON

J: \WAHCHANG\CV022806\RT\806RTF12.DWG

CH2M HILL

=1.0

07-07-92

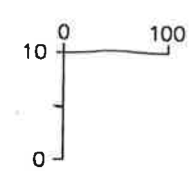



**LEGEND**

- WELL SCREEN INTERVAL
- GROUNDWATER ELEVATION ON 1/91
- GROUNDWATER ELEVATION ON 10/91
- SHALLOW GROUNDWATER TABLE ON 1/91
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW

**NOTE:**

* THE LOWER RIVER SOLIDS POND WAS EXCAVATED IN SUMMER AND FALL 1991.




SCALE IN FEET
VERTICAL EXAGGERATION = 10X

**FIGURE 4-17**
**SOLIDS AREA**
**CONCEPTUAL HYDROGEOLOGIC**
**CROSS SECTION D-D'**
RI REPORT
TELEDYNE WAH CHANG ALBANY
ALBANY, OREGON

CH2M HILL

J: \WAHCHANG\CVO22806\RT\806RTF15.DWG

1=1.0

# APPENDIX B

Feed Makeup Area Hydraulic Test Results

# Appendix B: Feed Makeup Area Testing Data Report

This appendix presents data from hydraulic testing in the Feed Makeup Area (FMA) of the ATI Millersburg Operations facility. The hydraulic testing was conducted to evaluate alternative pumping strategies that may enhance the effectiveness of the existing pump and treat system.

## 1. Background

Groundwater in the FMA is acidic and contains elevated concentrations of dissolved metals, anions/cations, and radionuclides (CH2M Hill, 1993). Specifically, several wells in the FMA have concentrations of combined radium-226 and radium-228 above the record of decision[1] (ROD) cleanup level of 5 picocuries per liter (pCi/L) and have pH levels that are acidic and below the pH secondary maximum contaminant level (MCL) based-cleanup level of 6.5 to 8.5 units. The ROD specified that groundwater pump and treat would be the remedial alternative in the FMA (EPA, 1994), and a groundwater extraction and treatment system (GETS) has operated in the FMA since 2002 (GSI, 2019). The GETS in the FMA comprises three extraction wells (EW-1, EW-2, and EW-3) that pump continuously. Construction details of FMA extraction wells and monitoring wells are summarized in Table B-1. Well locations are shown in Figure 3 of the report to which this appendix is attached.

**Table B-1. Extraction Well and Monitoring Well Construction in the FMA**

| Well ID | Total Depth (feet bgs) | Screened Interval (feet bgs) | Screen Diameter (inches) | Screen Material | Filter Pack Material |
|---|---|---|---|---|---|
| EW-1 | 34.0 | 21 to 31 | 4 | V-Wire Wrap PVC | 8 x 12 CSS |
| EW-2 | 32.0 | 19 to 29 | 4 | V-Wire Wrap PVC | 8 x 12 CSS |
| EW-3 | 33.0 | 20 to 30 | 4 | V-Wire Wrap PVC | 8 x 12 CSS |
| PW-28A | 32.0 | 20 to 30 | 4 | PVC Schedule 40 | 10 x 20 CSS |
| PW-50A | 32.0 | 20 to 30 | 4 | PVC Schedule 40 | 10 x 20 CSS |

**Notes**

EW = extraction well
bgs = below ground surface
CSS = Colorado Silica Sand
PVC = polyvinyl chloride
PW = monitoring well

Since 2016, combined radium and pH in FMA groundwater appear to have stabilized (GSI, 2018).[2] On December 29, 2016, ATI submitted *Feed Makeup Area Groundwater Extraction System – Proposed Operational Modifications to Accelerate Attainment of Cleanup Levels at EW-2 and PW-28Aa* (Work Plan) to the U.S. Environmental Protection Agency (EPA) to evaluate whether alternative pumping strategies would enhance the effectiveness of groundwater extraction in the FMA. The Work Plan proposed using groundwater samples to determine empirically whether modifications to the existing extraction well schedules[3] would accelerate attainment of cleanup levels for combined radium and raise the pH in the source area. ATI

[1] EPA. 1994. Record of Decision Declaration, Decision Summary, and Responsiveness Summary for Final Remedial Action of Groundwater and Sediments Operable Unit, Teledyne Wah Chang Albany Superfund Site, Millersburg, Oregon. June 10.
[2] See Figure 4.
[3] "Schedules" means the duration that a pump is on or off (for example, continuous pumping, or 8 hours on followed by 16 hours off).

responded to EPA's comments on the document on April 18, 2017, and EPA approved the revised Work Plan on May 22, 2017, subject to additional discussions with ATI on June 5, 2017.

In September 2017, ATI conducted hydraulic testing to confirm that alternative pumping strategies would not result in loss of hydraulic capture of contaminated groundwater, and to collect data that could be used to optimize the on/off schedule for pulse-pumping strategies. GSI Water Solutions, Inc. (GSI) revised the pumping strategies based on the hydraulic tests and presented the revised strategies to EPA in March 2018 (Modified Work Plan; GSI, 2018). The proposed strategies involved shutting down extraction wells EW-1 and EW-3, and modifying operation of extraction well EW-2 in two ways:

- **Phase 1.** Extraction well EW-2 would be pumped continuously, which would focus capture on the most contaminated groundwater in the FMA.
- **Phase 2.** Extraction well EW-2 would be pulse-pumped, which would minimize groundwater stagnation and provide an opportunity for contaminants sorbed on soil to partition into groundwater when soil is rewetted.

The Modified Work Plan describes three additional phases and proposes to evaluate whether to implement those phases based on the results of Phase 1 and Phase 2.

## 2. Geologic and Hydrogeologic Setting

ATI is located in the Willamette Valley, an alluvial plain bounded by volcanic rocks of the Cascade Range to the east and volcanic and marine sedimentary rocks of the Coast Range to the west. Over the course of millions of years, the Willamette Valley has been filled with thousands of feet of volcanic deposits and sediments eroded from the Coast Range and Cascade Range (CH2M Hill, 1993; O'Connor et al., 2001). In the FMA, the subsurface comprises three stratigraphic units, from oldest (bottom) to youngest (top):

- The **Blue Clay** was deposited by lakes or rivers; it is the oldest unit and found within topographic lows of the paleotopography (CH2M Hill, 1993). On boring logs at the FMA, the top of the Blue Clay occurs at 30 to 33 feet (ft) below ground surface and is described as a "stiff clay" or "clay." With a measured hydraulic conductivity of 0.00043 feet per day (ft/day) (CH2M Hill, 1993), the Blue Clay acts as an aquitard.
- The **Linn Gravel** is an alluvial fan deposited by streams draining the Cascade Mountains (CH2M Hill, 1993; Crenna and Yeats, 1994) between 28,000 and 36,000 years before present (Roberts, 1984). On boring logs in the FMA, the Linn Gravel is typically described as a "silty gravel," "silty sandy gravel," "sand with gravel" or "well graded gravel" with silt interbeds. These descriptions indicate that the Linn Gravel is a dirty gravel characterized by a high fines content. The Linn Gravel is the primary water-bearing unit in the FMA, is about 20 feet thick, and is unconfined, meaning that the water table occurs below the top of the gravel and the upper part of the gravel is unsaturated (see static depth to water measurements and depth to Linn Gravel measurements in Figure A-1 and Figure A-2).
- The **Willamette Silt** is made up of fine-grained sediments that settled out of floodwaters that inundated the Willamette Valley over 19,000 years ago (Glenn, 1965; O'Connor et al., 2001). In the FMA, the Willamette Silt is primarily described as a "silty loam," a "silt," and a "sand with silt." The Willamette Silt is unsaturated in the FMA, although it may have the potential to become seasonally saturated if extraction wells were to be turned off.[4] In the FMA, the Willamette Silt is present from ground surface to between 8 and 10 feet below ground surface.

Based on aquifer tests conducted in the extraction area (which includes the FMA) as part of the remedial investigation/feasibility study (RI/FS), the Linn Gravel is characterized by a relatively low hydraulic conductivity

[4] The observation that the Willamette Silt is unsaturated in the FMA is based on groundwater elevations measured during the spring and fall of 2016, when all extraction wells were pumping.

(a range of 0.6 ft/day to 26 ft/day, and a geometric mean of 3.4 ft/day).[5] In order to evaluate the hydraulic conductivity of the Linn Gravel in the FMA, GSI analyzed hydraulic testing data from when only EW-2 was pumped for about 8 days in September 2017. Plots of drawdown vs. time at observation wells EW-1 and PW-28A during the test are presented in Figure A-1 and Figure A-2, respectively.

The drawdown data exhibit the response of an unconfined aquifer to pumping, where early-time drawdown data are affected by instantaneous release of water from storage, middle-time data exhibit the effects of gravity drainage (during which time drawdown deviates from the nonequilibrium type curve), and late-time data exhibit a reduction in the effects of gravity drainage and follow a nonequilibrium type curve (see log–log plots of displacement vs. time in Figure A-1 and Figure A-2). Therefore, in order to calculate aquifer parameters, the drawdown data were analyzed using the Neuman (1974) solution for unsteady flow in an unconfined aquifer with delayed gravity response. The Neuman (1974) solutions, shown in Figure A-1 (EW-1) and Figure A-2 (PW-28A), indicate that the hydraulic conductivity in the FMA is about 0.4 ft/day. These low hydraulic conductivities are consistent with the very high horizontal hydraulic gradient in the FMA of 0.016 ft/ft, and the low pumping rates of extraction wells.

## 3. Methods

As described in the Work Plan, ATI evaluated two pumping phases for enhancing the effectiveness of groundwater extraction in the FMA: (1) pumping extraction well EW-2 at a constant rate for 24 hours per day (Phase 1) and (2) pulse-pumping extraction well EW-2, such that the well pumped for 16 hours, followed by an 8-hour rest period (Phase 2). The duration and pumping rates for each phase are summarized in Table B-2.

**Table B-2. Feed Makeup Area Well Operational Phases and Schedules**

| Phase | Phase Duration | Daily Pumping Schedule | | |
|---|---|---|---|---|
| | | **EW-1** (gpm) | **EW-2** (gpm) | **EW-3** (gpm) |
| 1 | April 2, 2018 – February 27, 2019 (332 days) | Off | 24 hours on | Off |
| 2 | February 27, 2019 – November 15, 2019 (262 days) | Off | 16 hours on<br>8 hours off | Off |

**Notes**

gpm = gallons per minute

EW = extraction well

During the summer of 2017, prior to initiating the optimization testing, ATI evaluated the condition of the wells by conducting down-hole well videos, installing new pumps, flushing discharge lines, and disassembling and cleaning flow meters. In addition, ATI conducted annual extraction well rehabilitation by brushing and surging in June 2018, shortly after the beginning of Phase 1 (GSI, 2018), and in June 2019, in the middle of Phase 2. GSI monitored combined radium concentrations and pH in extraction wells and select monitoring wells approximately quarterly during each phase, as shown in Table B-3.

[5] See summary of aquifer testing conducted as a part of the RI/FS in Table 4-17 of Section 4.4.6.1 and Appendix I of the RI/FS (CH2M Hill, 1993).

**Table B-3. Groundwater Sampling During Phase 1 and Phase 2**

| Phase | Quarter (Phase I and Phase II) | Sampling Date | Wells | | | | |
|---|---|---|---|---|---|---|---|
| | | | EW-1 | EW-2 | EW-3 | PW-28A | PW-50A |
| Baseline | | April 2017 | X | X | X | X | X |
| | | September 2017 | X | X | X | X | X |
| | | April 2018 | X | X | X | X | X |
| 1 | 2nd Quarter | May 2018 | X* | X | X* | X | X |
| | 3rd Quarter | August 2018 | -- | -- | -- | -- | -- |
| | 4th Quarter | October 2018 | X* | X* | X* | X | X |
| | 1st Quarter | February 2019 | X | X | X | X | X |
| 2 | 2nd Quarter | May 2019 | X | X | X | X | X |
| | 3rd Quarter | August 2019 | X | X | X | X | X |
| | 4th Quarter | October 2019 | X | X | X | X | X |
| | Final | November 2019 | X | X | X | X | X |

**Notes**

X = Groundwater sampled for combined radium and pH

-- = No sample collected

X* = Groundwater sampled for combined radium only

Note that the August 2018 quarterly samples were not collected during Phase 1 because extraction well EW-2 was offline from July 4 (when the well was shut down for sitewide maintenance) through August 22 (when GSI staff recognized that the well had not been turned on again).

## 4. Results

Table B-4 shows monthly pumping volumes for extraction well EW-2. Note that pumping volumes during the wet season are higher than during the dry season, due to higher groundwater levels during the wet season. The 2016 data reflect EW-2 pumping volumes when EW-1, EW-2, and EW-3 are pumping (i.e., prior to hydraulic testing). Peach-highlighted cells represent pumping volumes during Phase 1 of the FMA hydraulic test when only EW-2 was pumping continuously, and green-highlighted cells represent pumping volumes during Phase 2 of the FMA hydraulic test when only EW-2 was pulse-pumping.

**Table B-4. EW-2 Monthly Pumping Volumes (gallons)**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2016 | 10,570 | 10,432 | 10,722 | 11,468 | 8,406 | 9,969 | 7,342 | 5,174 | 1,974 | 2,744 | 1,982 | 0 |
| 2018 | 0 | 0 | 0 | 58,737 | 55,025 | 19,462 | Offline | Offline | 2,290 | 3,997 | 3,753 | 2,526 |
| 2019 | -- | -- | -- | Clog | 4,705 | 4,427 | 4,089 | 3,435 | 3,505 | 4,562 | -- | -- |

**Notes:**

-- No data

Clog: Pumping volumes are not reported because EW-2 discharge piping was clogged. On April 16 and April 17, GSI staff investigated the lower than average flows at EW-2 and determined that there was a blockage in the discharge piping between the flow meter and manifold. The line was replaced on April 25, and the flows increased.

Offline: Pumping volumes are not reported because EW-2 was offline from July 4, 2018, to August 22, 2018.

Monthly pumping volumes from 2017 are not shown because one or more of the extraction wells was off during most months of the year. Therefore, 2017 is not representative of monthly pumping when EW-1, EW-2 and EW-3 are all pumping.

Baseline (EW-1, EW-2, and EW-3 pump)

Phase 1 (EW-2 pumps continuously)

Phase 2 (EW-2 pulse-pumps)

Pumping only EW-2 during Phase 1 resulted in an increased EW-2 pumping rate and volume relative to when EW-1, EW-2, and EW-3 were all pumped. For example, pumping rates from EW-2 were 1.4 gallons per minute (gpm) in April 2018 during Phase 1, as compared to 0.27 gpm in April 2016. During Phase 2, pumping volumes from EW-2 were generally less than when EW-1, EW-2, and EW-3 were all operated and were less than pumping volumes during Phase 1. Combined radium concentrations and pH in groundwater during Phase 1 and Phase 2 of the groundwater extraction optimization tests are provided in Table B-5 and Table B-6, respectively. Graphs of the data are provided in Figure A-3. No clear trends in radium concentrations or pH are evident in the data.

**Table B-5. Combined Radium in Groundwater in the FMA, Phase 1 and Phase 2 (pCi/L).**

| Phase | Sampling Date | Wells | | | | |
|---|---|---|---|---|---|---|
| | | EW-1 | EW-2 | EW-3 | PW-28A | PW-50A |
| Baseline | April 2017 | 3.80 | **25.6** | 0.73 | **23.3** | 2.84 |
| | September 2017 | 2.01 | **24.0** | 1.06 | **36.0** | 3.00 |
| | April 2018 | 3.43 | **26.9** | 0.55 | **48.4** | **5.03** |
| 1 | May 2018 | 4.82 | **19.7** | 0.45 | **46.0** | **9.4** |
| | October 2018 | **7.77** | **22.3** | 0.45 | 1.93 | **10.3** |
| | February 2019 | **5.23** | **34.0** | 0.36 U | **46.0** | 4.39 |
| 2 | May 2019 | 4.80 | **19.8** | 0.16 | **43.0** | 4.50 |
| | August 2019 | 4.69 | **15.0** | **5.25** | **40.0** | **26.0** |
| | October 2019 | **5.88** | **24.4** | 0.49 | **46.0** | **5.51** |
| | November 2019 | **6.44** | **16.9** | 0.66 | **42.0** | 0.96 |

**Notes**

All combined radium results are in picocuries per liter (pCi/L).

**Bold** values exceed the cleanup level for combined radium of 5.0 pCi/L.

U = Not detected above the method reporting limit

### Table B-6. Groundwater pH in the FMA, Phase 1 and Phase 2

| Phase | Sampling Event | Wells | | | | |
|---|---|---|---|---|---|---|
| | | EW-1 | EW-2 | EW-3 | PW-28A | PW-50A |
| Baseline | April 2017 | **4.08** | **4.25** | **5.19** | **4.25** | **3.73** |
| | September 2017 | **4.73** | **3.09** | **4.97** | **4.19** | **3.71** |
| | April 2018 | **4.66** | **3.07** | **5.40** | **4.44** | **3.98** |
| 1 | May 2018 | NM | **3.19** | NM | **4.00** | **4.01** |
| | October 2018 | NM | NM | NM | **4.24** | **3.59** |
| | February 2019 | **4.33** | **2.79** | **5.64** | **3.94** | **3.68** |
| 2 | May 2019 | **4.49** | **3.15** | **4.83** | **3.76** | **3.62** |
| | August 2019 | **3.99** | **3.00** | **4.26** | **2.84** | **3.01** |
| | October 2019 | **4.13** | **2.71** | **4.71** | **3.45** | **3.34** |
| | November 2019 | **3.76** | **1.07** | **3.91** | **3.32** | **3.23** |

**Notes**

**Bold** values are outside of the pH cleanup level of 6.5 to 8.5.

NM = Not measured

Table B-7 shows the nanograms of combined radium removed during 2016, and during Phase 1 and Phase 2 of hydraulic testing.

### Table B-7. Nanograms of Combined Radium Removed During Phase 1 and Phase 2

| | 2016 | Phase 1 | Phase 2 |
|---|---|---|---|
| **January** | 326 | -- | -- |
| **February** | 322 | -- | -- |
| **March** | 331 | -- | -- |
| **April** | 291 | 1,374 | Clog |
| **May** | 213 | 1,002 | 70 |
| **June** | 261 | 354 | 65 |
| **July** | 186 | EW-2 Offline | 60 |
| **August** | 134 | EW-2 Offline | 40 |
| **September** | 55 | 42 | 41 |
| **October** | 88 | 52 | 113 |
| **November** | 63 | 48 | -- |
| **December** | EW-2 Offline | 33 | -- |
| Total Nanograms Removed | 2,269 | 2,905 | 389 |
| Total Grams Removed | $2.269 \times 10^{-6}$ | $2.905 \times 10^{-6}$ | $3.89 \times 10^{-7}$ |
| Total Mass Removed Over 3-Year Period | | **$5.563 \times 10^{-6}$ grams<br>$1.2 \times 10^{-8}$ pounds** | |

**Notes**

-- No data. The “Clog” and “Offline” notes are explained in the footnotes for Table B-4.

The nanograms of radium removed is based on the Radium-226 and Radium-228 concentrations measured during groundwater sampling and the pumping volumes in Table B-7. As shown below, a total of only 0.0000056 grams of combined radium were removed by the system during the period of 2016 through 2019.

## 5. Observations

GSI offers the following observations about the effectiveness of modifying extraction well pumping schedules in the FMA and anticipates discussing these observations further with EPA:

- **Overall System Effectiveness.** With the operation of the treatment system from 2016 through 2019, only approximately 0.0000056 grams (0.000000012 pounds) of combined radium were removed from the Linn Gravel groundwater.

- **Phase 1.** Continuously pumping EW-2 initially resulted in increased mass removal of radium (see Table B-7, and note mass removal in April and May of 2016 when EW-1, EW-2, and EW-3 were pumping, as compared to mass removal in April and May of Phase 1 [when only EW-2 was pumping]). However, over time the mass removal returned to a level where pumping only EW-2 removed about the same mass as pumping EW-1, EW-2, and EW-3 (September to December 2016 and Phase 1 data in Table B-7). Therefore, over the long term, pumping EW-2 may provide the same benefit, in terms of mass removal, as operating all three extraction wells. However, GSI cannot rule out that the reduced effectiveness of mass removal long term during Phase 1 may be related to reduced pumping volumes due to the pipe clogging at EW-2, which was not discovered until April 2019 (see note following Table B-7). GSI concludes that pumping only EW-2 continuously removed as much or more mass of radium than pumping EW-1, EW-2, and EW-3 together.

- **Phase 2.** Pulse-pumping EW-2 resulted in EW-2 removing less mass than pumping only EW-2 continuously (Phase 1) and less mass than pumping EW-1, EW-2, and EW-3 continuously. Therefore, GSI concludes that pulse-pumping EW-2 does not result in enhanced cleanup of radium.

- **Additional Phases.** The initial Work Plan included the following three additional work phases:

    - Phase 3: Alternate Pumping of Extraction Wells
    - Phase 4: Water-Flushing or Buffered Injection into EW-1 and EW-3 While Extracting From EW-2
    - Phase 5: Water-Flushing or Buffered Injection into Injection Points Installed In the PW-28A Area After Consultation With EPA.

    Due to the limited success of Phase 1 and Phase 2 pumping strategies and the low hydraulic conductivity of the shallow aquifer system, GSI does not recommend proceeding with testing of other pumping strategies at this time. Other remedial options and potential delivery methods should be evaluated and discussed with EPA.

In conclusion, at this time, GSI recommends turning off extraction wells EW-1 and EW-3, and pumping extraction well EW-2 continuously. GSI also recommends tracking flow volumes monthly and radium concentrations biannually to assess the long-term effectiveness of this pumping strategy, and evaluating other remedial methods.

## 6. References

CH2M Hill. 1993. Remedial Investigation / Feasibility Study—Teledyne Wah Chang Albany.

Crenna, P. A., and R. S. Yeats. 1994. Late Cenozoic Tectonics and Paleogeography of the Salem Metropolitan Area, Central Willamette Valley, Oregon. In: *Oregon Geology*, Vol. 56, No. 6.

EPA. 1994. Record of Decision: Declaration, Decision Summary, and Responsiveness Summary for Final Remedial Action of Groundwater and Sediments Operable Unit—Teledyne Wah Chang Albany Superfund Site, Millersburg, Oregon. U.S. Environmental Protection Agency. June 1994.

Glenn, J. L. 1965. Late Quaternary Sedimentation and Geological History of the North Willamette Valley, Oregon: Corvallis, Oregon State University, Ph. D. Dissertation.

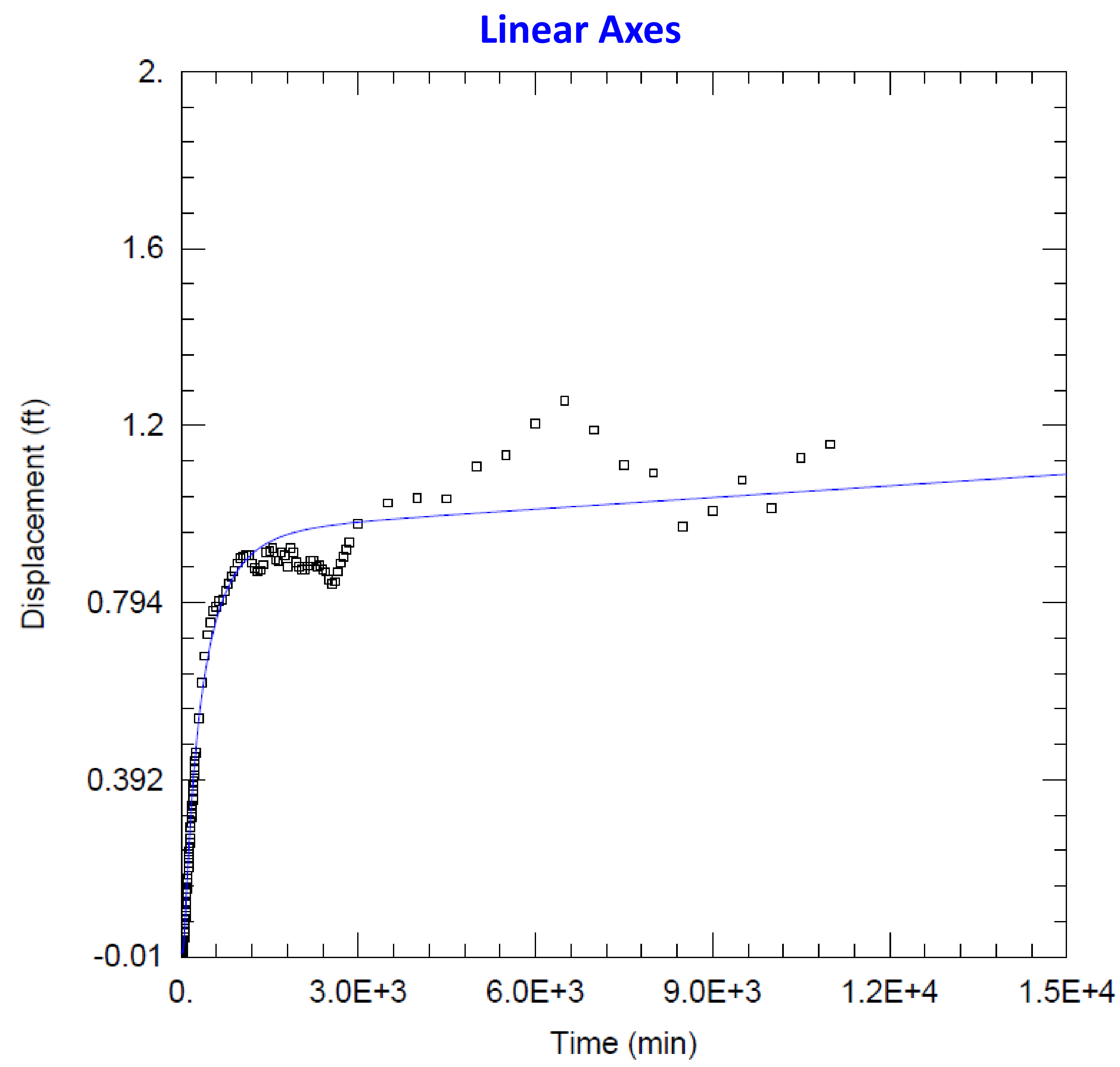
GSI. 2018. Feed Makeup Area Groundwater Extraction System—Operational Modifications to Accelerate Attainment of Cleanup Levels at EW-2 and PW-28A. Prepared by GSI Water Solutions, Inc. March 2018.

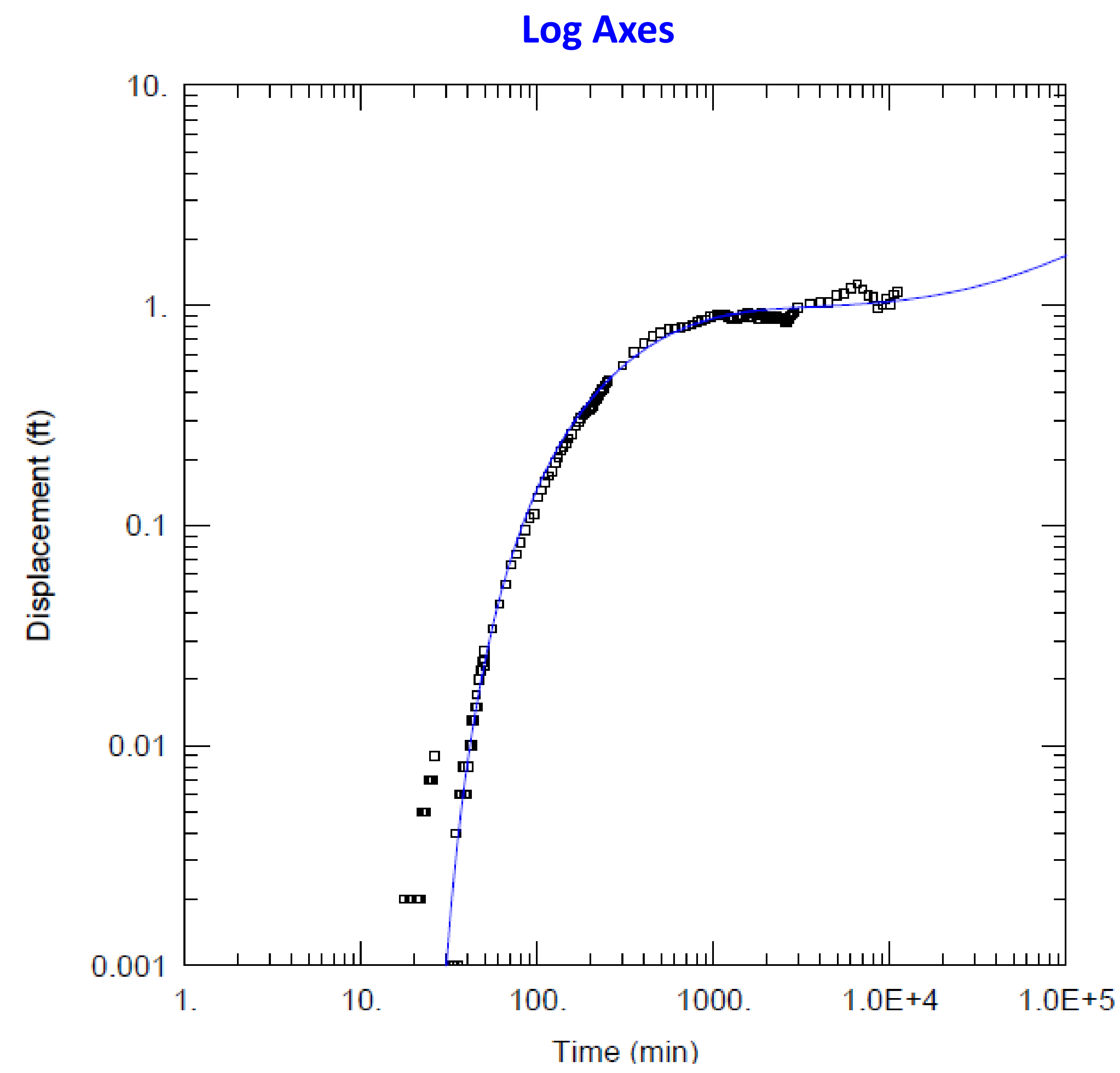
GSI. 2019. Extraction Area Groundwater Remedial Action Progress Summary—Year 2018. Prepared by GSI Water Solutions, Inc. Prepared for ATI Millersburg Operations. March 2019.

Neuman, S.P., 1974. Effect of partial penetration on flow in unconfined aquifers considering delayed gravity response, Water Resources Research, vol. 10, no. 2, pp. 303-312.

Roberts, M. C. 1984. The Late Cenozoic History of an Alluvial Fill—the Southern Willamette Valley, Oregon. In: Mahaney, W. C., ed., Correlation of Quaternary Chronologies: Norwich, Great Britain, Geo Books.

O'Connor, J. E., A. Sarna-Wojcicki, K. C. Wozniak, D. J. Polette, and R. J. Fleck. 2001. Origin, Extent, and Thickness of Quaternary Geologic Units in the Willamette Valley, Oregon. U.S. Geological Survey Professional Paper 1620.




| Well ID | Analysis Type | Aquifer Summary | | | T [2] ($ft^2$/min) | $S_y$ (-) | S (-) | β (-) | K [3] (ft/day) |
|---|---|---|---|---|---|---|---|---|---|
| | | Top Linn Gravel (feet bgs) | Depth to Water [1] (feet TOC) | Top Blue Clay (feet bgs) | | | | | |
| EW-1 | Unconfined Neuman Time-Drawdown | 12 | 12.90 | 32 | 0.0054 | 0.10 | 0.000828 | 0.20 | 0.41 |

Notes:

(1) DTW measured on September 26, 2017. Represents non-pumping conditions

(2) From Test 2 (Extraction Well EW-2 pumping for about 8 days)

(3) FMA wells are flush-mount completions; therefore, the top of casing is approximately the same elevation as ground surface. As such, the calculation of K is based on an aquifer thickness that is approximate but reasonable.

T = Transmissivity
S = Storage
K = Hydraulic Conductivity
$S_y$ = Specific Yield
$\beta = (r^2)(K_v) / (b^2)(K_h)$

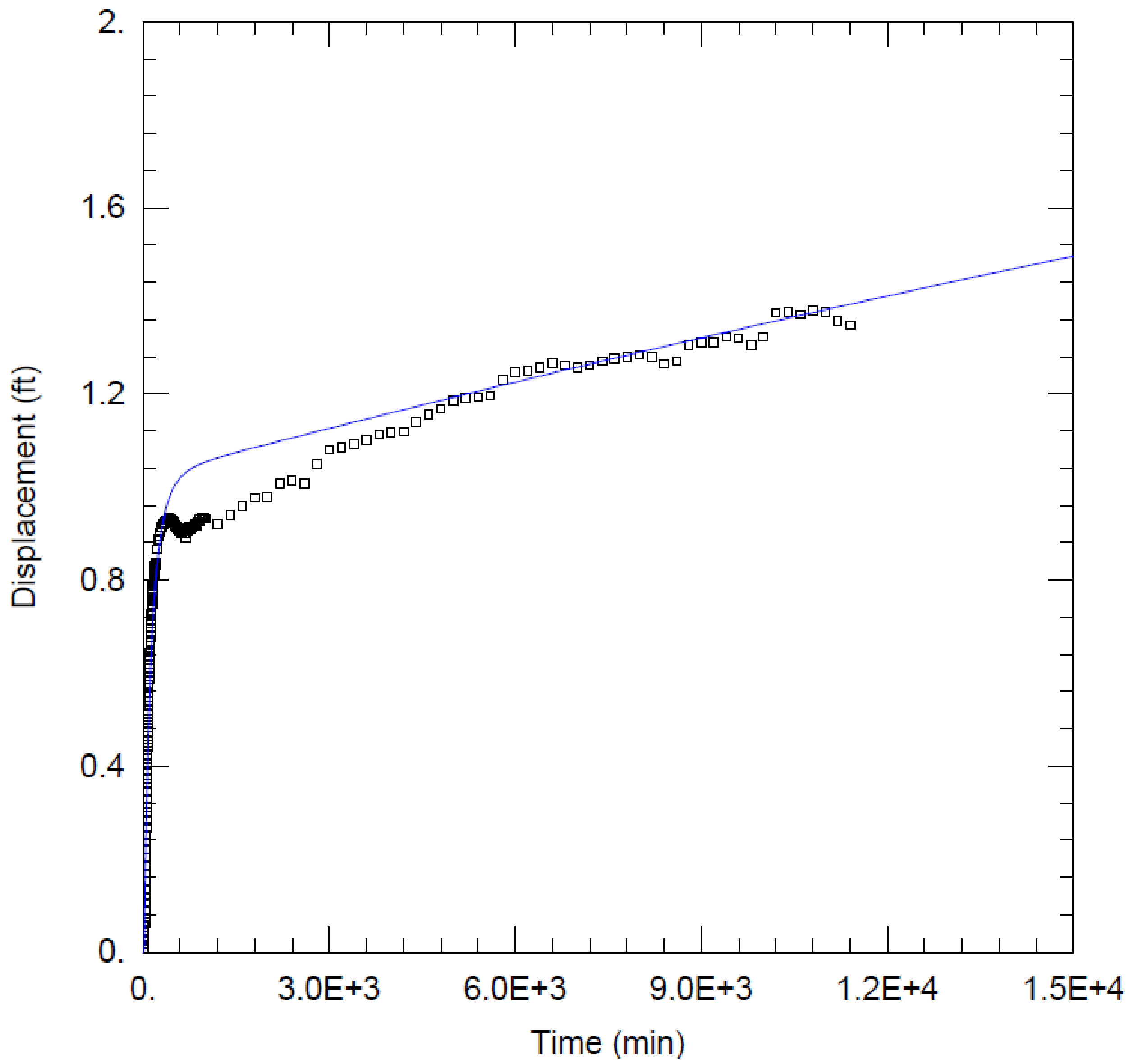
FMA = Feed Makeup Area
bgs = below ground surface
TOC = top of casing

ft2/min = square feet per minute
ft/day = feet per day

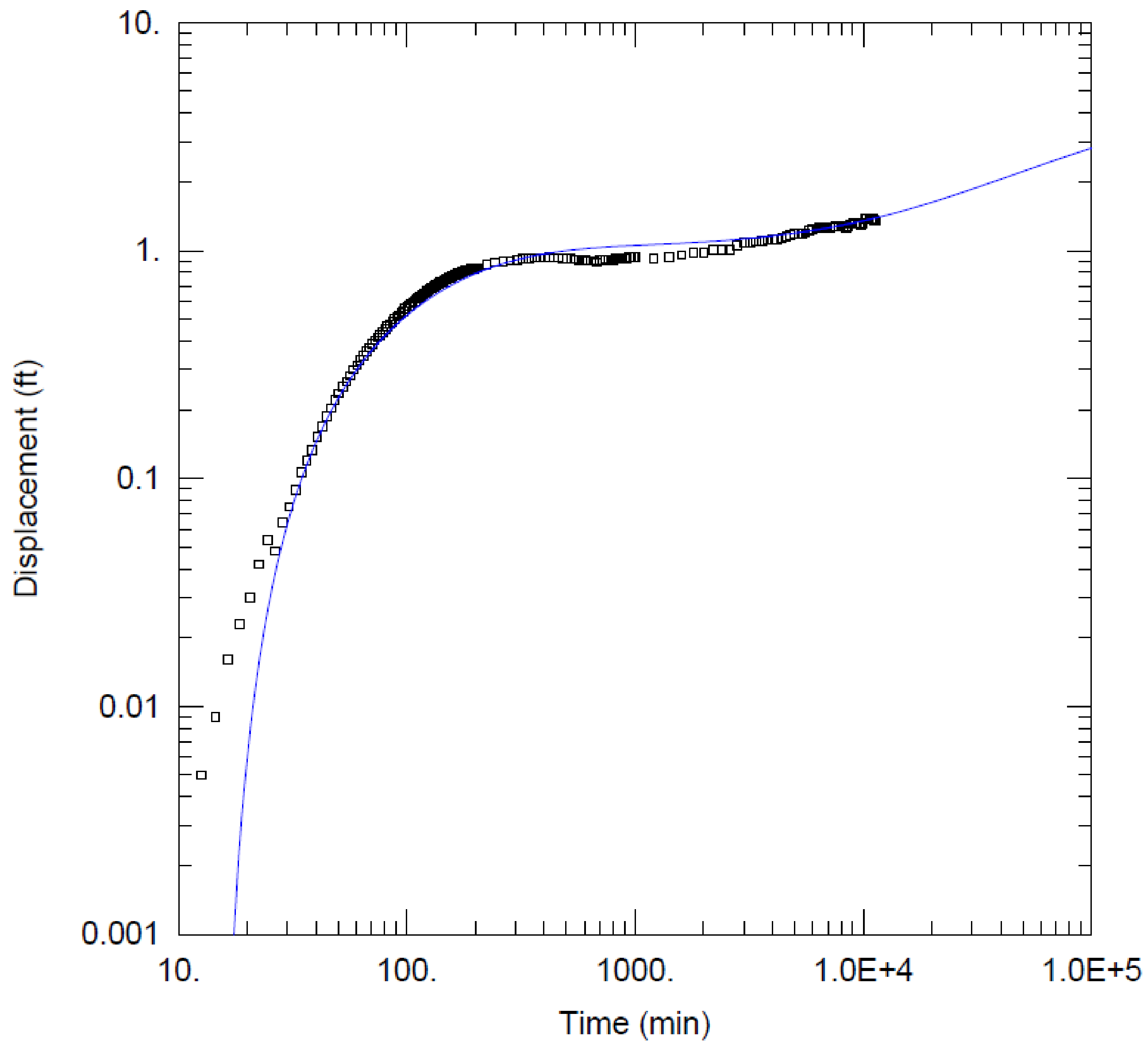
GSI Water Solutions, Inc.

**FIGURE B-1**
EW-1 Aquifer Test Data
*FMA Hydraulic Testing Data Report*

## Linear Axes




## Log Axes




| Well ID | Analysis Type | Aquifer Summary | | | $T$[2] | $S_y$ | S | β | K[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | Top Linn Gravel (feet bgs) | Depth to Water[1] (feet TOC) | Top Blue Clay (feet bgs) | (ft$^2$/min) | (-) | (-) | (-) | (ft/day) |
| PW-28A | Unconfined Neuman Time-Drawdown | 10 | 13.68 | 30.5 | 0.0049 | 0.25 | 0.00250 | 0.21 | 0.42 |

Notes:

(1) DTW measured on September 26, 2017. Represents non-pumping conditions

(2) From Test 2 (Extraction Well EW-2 pumping for about 8 days)

(3) FMA wells are flush-mount completions; therefore, the top of casing is approximately the same elevation as ground surface. As such, the calculation of K is based on an aquifer thickness that is approximate but reasonable.

T = Transmissivity
S = Storage
K = Hydraulic Conductivity
$S_y$ = Specific Yield
$\beta = (r^2)(K_v) / (b^2)(K_h)$

FMA = Feed Makeup Area
bgs = below ground surface
TOC = top of casing

ft2/min = square feet per minute
ft/day = feet per day

GSI Water Solutions, Inc.

**FIGURE B-2**

PW-28A Aquifer Test Data

*FMA Hydraulic Testing Data Report*

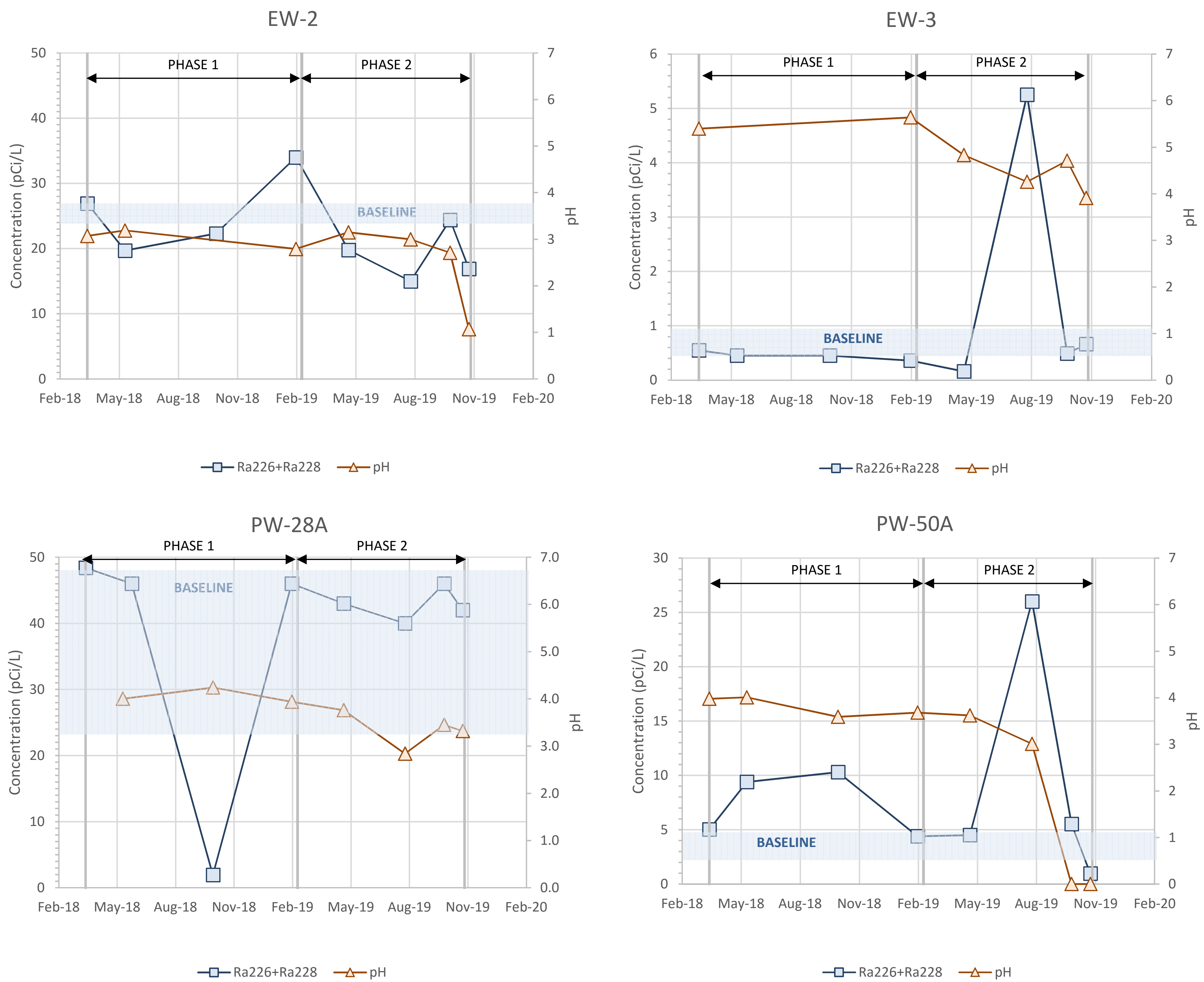



**FIGURE B-3**
Combined Radium 226 + 228 and pH in the FMA
*FMA Hydraulic Testing Data Report*

# APPENDIX C

Well Construction Details

**Appendix C. Well Construction Details**

*ATI Millersburg Operations, Oregon*

| Station | Well Construction Data | | | | | Screen Depth | | Screen Elevations | | Regulatory Identification | Location Data | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well | Borehole Diameter (inches) | Well Diameter (inches) | TOC Elevations (ft msl) | Stick Up (ft ags) | Bottom of Well Casing (ft bgs) | Top (ft bgs) | Bottom (ft bgs) | Top (ft msl) | Bottom (ft msl) | Date Constructed | Easting | Northing |
| Extraction Area | | | | | | | | | | | | |
| EW-1 | 10 | 4 | 209.77 | -- | 34 | 21 | 31 | 188.77 | 178.77 | 1/14/2000 | 7534746.57 | 372294.70 |
| EW-2 | 10 | 4 | 209.66 | -- | 32 | 19 | 29 | 190.66 | 180.66 | 3/27/2000 | 7534713.54 | 372331.76 |
| EW-3 | 10 | 4 | 210.18 | -- | 33 | 20 | 30 | 190.18 | 180.18 | 3/28/2000 | 7534680.78 | 372366.13 |
| EW-4 | 10 | 4 | 210.00[1] | – | 36 | 25 | 35 | 185.00 | 175.00 | 3/30/2000 | 7534792.58 | 371360.00 |
| EW-5 | 10 | 4 | 208.92[1] | – | 34.5 | 21 | 31 | 187.92 | 177.92 | 1/13/2000 | 7534785.04 | 371435.37 |
| EW-6 | 10 | 4 | 208.70[1] | – | 36 | 23 | 33 | 185.70 | 175.70 | 3/29/2000 | 7534746.56 | 371550.31 |
| PW-21A | 8 | 4 | 209.36 | 2.46 | 23.3 | 11.3 | 21.3 | 198.06 | 188.06 | 4/18/1989 | 7534098.87 | 372759.67 |
| PW-22A | 8 | 4 | 210.37 | 2.27 | 29.0 | 17.0 | 27.0 | 193.37 | 183.37 | 4/14/1989 | 7534242.00 | 372503.00 |
| PW-23A | 8 | 4 | 212.02 | 2.52 | 34.6 | 22.6 | 32.6 | 189.42 | 179.42 | 4/12/1989 | 7534373.00 | 372257.00 |
| PW-24A | 8 | 4 | 212.05 | 2.15 | 31.8 | 19.8 | 29.8 | 192.25 | 182.25 | 4/7/1989 | 7534489.00 | 372011.00 |
| PW-25A | 8 | 4 | 211.88 | 1.88 | 33.4 | 21.4 | 31.4 | 190.48 | 180.48 | 4/4/1989 | 7534651.00 | 371698.00 |
| PW-26A | 8 | 4 | 213.18 | 2.08 | 32.5 | 20.5 | 30.5 | 192.68 | 182.68 | 3/29/1989 | 7534777.00 | 371385.00 |
| PW-27A | 8 | 4 | 210.99 | -0.41 | 31.62 | 14.62 | 29.62 | 196.37 | 181.37 | 5/4/1989 | 7534766.00 | 372075.00 |
| PW-28A | 8 | 4 | 209.13 | -0.17 | 32.0 | 20.0 | 30.0 | 189.13 | 179.13 | 4/28/1989 | 7534727.93 | 372339.59 |
| PW-29A | 8 | 4 | 214.22 | 2.42 | 26.5 | 14.5 | 24.5 | 199.72 | 189.72 | 3/16/1989 | 7535286.00 | 371780.00 |
| PW-47A | 8 | 4 | 210.79 | -0.31 | 27.5 | 15.0 | 25.0 | 195.79 | 185.79 | 9/26/1990 | 7534785.78 | 371509.24 |
| PW-48A | 8 | 4 | 214.5 | -0.3 | 21.6 | 9.6 | 19.6 | 204.9 | 194.9 | 9/21/1990 | 7534875.00 | 371314.00 |
| PW-49A | 8 | 4 | 216.98 | 2.48 | 33.8 | 21.7 | 31.7 | 195.28 | 185.28 | 9/17/1990 | 7534830.00 | 371188.00 |
| PW-50A | 10 | 4 | 209.08 | 0.8 | 32 | 20 | 30 | 189.08 | 179.08 | 10/19/1997 | 7534661.29 | 372364.16 |
| PW-51A | 10 | 4 | 209.27 | -0.36 | 31 | 19 | 29 | 190.27 | 180.27 | 10/18/1997 | 7534744.58 | 372258.62 |
| PW-52A | 8 | 2 | 210.36 | -- | 32 | 22 | 32 | 188.36 | 178.36 | 11/18/1999 | 7534773.56 | 372262.59 |
| PW-57A | 8 | 2 | 210.87 | -- | 31 | 21 | 31 | 189.87 | 179.87 | 11/17/1999 | 7534748.98 | 371487.82 |
| PW-96A | 10 | 2 | 210.54 | -- | 33.5 | 23.5 | 33.5 | 187.04 | 177.04 | 5/6/2008 | 7534770.43 | 371569.02 |
| PW-97A | 10 | 2 | 210.24 | -- | 33.5 | 23.5 | 33.5 | 186.74 | 176.74 | 5/6/2008 | 7534729.88 | 371547.93 |

**Appendix C. Well Construction Details**

*ATI Millersburg Operations, Oregon*

| Station | Well Construction Data | | | | | Screen Depth | | Screen Elevations | | Regulatory Identification | Location Data | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well | Borehole Diameter (inches) | Well Diameter (inches) | TOC Elevations (ft msl) | Stick Up (ft ags) | Bottom of Well Casing (ft bgs) | Top (ft bgs) | Bottom (ft bgs) | Top (ft msl) | Bottom (ft msl) | Date Constructed | Easting | Northing |
| PW-102A | 4 | 2 | 209.07 | -0.54 | 30.7 | 15.7 | 30.7 | 193.37 | 178.37 | 5/29/2013 | 7534652.50 | 372415.71 |
| PW-103A | 4 | 2 | 211.02 | -0.38 | 32 | 17 | 32 | 194.02 | 179.02 | 5/29/2013 | 7534767.74 | 372220.45 |
| Fabrication Area | | | | | | | | | | | | |
| E-11 | 4 | 2 | 208.23 | -0.2 | 13.5 | 9.0 | 13.5 | 199.23 | 194.73 | 7/7/2009 | 7534410.70 | 373474.88 |
| EI-5 | 4 | 2 | -- | -0.5 | 16.1 | 11.0 | 16.0 | -- | -- | 7/9/2009 | -- | -- |
| FW-1 | 12 | 6 | 210.26 | - | 29.5 | 12.0 | 27.0 | 198.26 | 183.26 | 4/5/2000 | 7535259.10 | 372991.90 |
| FW-2 | 12 | 6 | 208.35 | - | 30.5 | 13.0 | 28.0 | 195.35 | 180.35 | 4/4/2000 | 7534684.10 | 372885.65 |
| FW-3 | 12 | 6 | 206.66 | - | 21.5 | 9.0 | 19.0 | 197.66 | 187.66 | 4/3/2000 | 7534541.83 | 373230.98 |
| FW-4 | 12 | 6 | 195.37 | - | 25.0 | 7.5 | 22.5 | 187.87 | 172.87 | 8/4/2000 | 7535368.47 | 372468.98 |
| FW-5 | 12 | 6 | 201.86 | - | 24.2 | 11.7 | 21.7 | 190.16 | 180.16 | 8/2/2000 | 7534391.39 | 372872.11 |
| FW-6 | 12 | 6 | 207.51 | -2.1 | 20.4 | 8.0 | 18.0 | 199.51 | 189.51 | 8/3/2000 | 7534176.99 | 373575.66 |
| FW-7 | 12 | 6 | 201.6 | -0.55 | 28.5 | 13.5 | 28.5 | 188.1 | 173.1 | 3/1/2001 | 7535592.91 | 372553.28 |
| I-2 | 4 | 2 | -- | -0.5 | 13.9 | 9.0 | 15.5 | -- | -- | 7/8/2009 | -- | -- |
| I-3 | 4 | 2 | -- | -0.5 | 14.3 | 10.0 | 15.0 | -- | -- | 7/8/2009 | -- | -- |
| MW-01A | - | 2 | 205.2 | 2.55 | 19.5 | 9.5 | 19.5 | 195.7 | 185.7 | 9/30/1998 | 7535576.24 | 372516.82 |
| MW-02A | - | 2 | 204.83 | -0.39 | 19.3 | 9.3 | 19.3 | 195.53 | 185.53 | 9/30/1998 | 7535624.16 | 372719.94 |
| MW-03A | - | 2 | 207.59 | -0.3 | 19.8 | 9.8 | 19.8 | 197.79 | 187.79 | 9/30/1998 | 7535675.20 | 372901.19 |
| MW-04A | - | 2 | 204.62 | 1.66 | 17.5 | 7.5 | 17.5 | 197.12 | 187.12 | 10/1/1998 | 7535750.20 | 372698.07 |
| MW-05A | 6.5 | 2 | 213.98 | 2.32 | 26.5 | 16.0 | 26.0 | 197.98 | 187.98 | 3/25/1999 | 7535980.41 | 372689.74 |
| MW-06A | 6 | 2 | 211.64 | -0.38 | 29.5 | 19.0 | 29.0 | 192.64 | 182.64 | 3/23/1999 | 7535955.41 | 372484.53 |
| MW-07A | 8.5 | 2 | 200.49 | -0.38 | 19.5 | 9.0 | 19.0 | 191.49 | 181.49 | 3/24/1999 | 7535567.91 | 372290.78 |
| MW-08A | 6.5 | 2 | 201.23 | -0.5 | 19.5 | 9.0 | 19.0 | 192.23 | 182.23 | 3/25/1999 | 7535672.08 | 372210.57 |
| MW-09A | 6 | 2 | 210 | -0.34 | 34.5 | 24.0 | 34.0 | 186 | 176 | 3/24/1999 | 7535902.29 | 372314.74 |
| MW-10A | 6 | 2 | 212.49 | 2.52 | 25.5 | 15.0 | 25.0 | 197.49 | 187.49 | 3/26/1999 | 7535758.54 | 372514.74 |
| MW-11A | 6 | 2 | 211.02 | -0.11 | 25.5 | 15.5 | 25.5 | 195.52 | 185.52 | 8/4/1999 | 7535612.70 | 372455.36 |
| PW-01A | 8 | 4 | 211.44 | 2.42 | 21.0 | 9.0 | 19.0 | 202.44 | 192.44 | 5/7/1989 | 7534477.85 | 372983.56 |
| PW-03A | 8 | 4 | 210.5 | 1.95 | 22.0 | 15.0 | 20.0 | 195.5 | 190.5 | 5/5/1989 | 7534315.35 | 372888.77 |

## Appendix C. Well Construction Details

*ATI Millersburg Operations, Oregon*

| Station | Well Construction Data | | | | | Screen Depth | | Screen Elevations | | Regulatory Identification | Location Data | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well | Borehole Diameter (inches) | Well Diameter (inches) | TOC Elevations (ft msl) | Stick Up (ft ags) | Bottom of Well Casing (ft bgs) | Top (ft bgs) | Bottom (ft bgs) | Top (ft msl) | Bottom (ft msl) | Date Constructed | Easting | Northing |
| PW-10 | 6 | 2 | 211.53 | 2.14 | 12.0 | 7.0 | 11.0 | 204.53 | 200.53 | 10/31/1986 | 7534200.49 | 373580.47 |
| PW-11 | 6 | 2 | 208.53 | -0.45 | 17.8 | 11.8 | 16.8 | 196.73 | 191.73 | 10/29/1986 | 7534362.11 | 373341.62 |
| PW-12 | 6 | 2 | 209.97 | 1.7 | 19.2 | 10.9 | 17.4 | 199.07 | 192.57 | 10/30/1986 | 7534562.53 | 373235.78 |
| PW-13 | 8 | 4 | 207.78 | -0.35 | 16.7 | 11.8 | 16.3 | 195.98 | 191.48 | 11/6/1986 | 7534383.41 | 373449.95 |
| PW-14[2] | - | - | 209.52 | 0.43 | - | - | - | - | - | - | 7534652.85 | 373546.06 |
| PW-15AR | 10 | 2 | 206.5 | 1.85 | 20.5 | 10.0 | 20.0 | 196.5 | 186.5 | 9/14/1999 | 7534474.66 | 374177.60 |
| PW-16A | 8 | 4 | 209.97 | 2.45 | 29.0 | 17.0 | 27.0 | 192.97 | 182.97 | 4/26/1989 | 7533848.68 | 373397.11 |
| PW-19A | 8 | 4 | 210.43 | 1.75 | 20.0 | 8.0 | 18.0 | 202.43 | 192.43 | 4/20/1989 | 7533893.47 | 373151.27 |
| PW-20A | 8 | 4 | 210.42 | 2.12 | 22.0 | 10.0 | 20.0 | 200.42 | 190.42 | 4/18/1989 | 7533987.22 | 372966.90 |
| PW-30A | 8 | 4 | 199.75 | 1.5 | 17.2 | 5.0 | 15.0 | 194.75 | 184.75 | 4/5/1989 | 7535378.89 | 372499.19 |
| PW-31A | 8 | 4 | 214.71 | 2.16 | 28.2 | 16.2 | 26.2 | 198.51 | 188.51 | 4/7/1989 | 7535619.51 | 373196.06 |
| PW-32A | 8 | 4 | 212.56 | 2.34 | 21.5 | 9.5 | 19.5 | 203.06 | 193.06 | 4/27/1989 | 7534899.23 | 373333.59 |
| PW-33A | 8 | 4 | 212.4 | 2.4 | 18.5 | 11.5 | 16.5 | 200.9 | 195.9 | 4/13/1989 | 7534912.44 | 373764.91 |
| PW-34A | 8 | 4 | 210.73 | 2.55 | 16.1 | 9.0 | 14.0 | 201.73 | 196.73 | 4/11/1989 | 7534884.84 | 374127.42 |
| PW-42A | 8 | 4 | 209.98 | -0.16 | 22.0 | 10.0 | 20.0 | 199.98 | 189.98 | 4/25/1989 | 7534826.80 | 373024.19 |
| PW-45A | 8 | 4 | 211.69 | -0.4 | 24.2 | 11.7 | 21.7 | 199.99 | 189.99 | 9/5/1990 | 7535448.68 | 372761.69 |
| PW-46A | 8 | 4 | 209.61 | -0.34 | 23.0 | 10.5 | 20.5 | 199.11 | 189.11 | 9/11/1990 | 7535246.60 | 372561.69 |
| PW-68A | 10 | 2 | 211.63 | -0.36 | 20.5 | 10.0 | 20.0 | 201.63 | 191.63 | 8/16/1999 | 7535482.01 | 372955.44 |
| PW-69A | 10 | 2 | 209.7 | -0.23 | 20.5 | 10.0 | 20.0 | 199.7 | 189.7 | 8/20/1999 | 7535163.23 | 373020.79 |
| PW-70AR | 10 | 2 | 210.57 | -0.25 | 20.5 | 10.0 | 20.0 | 200.57 | 190.57 | 9/16/1999 | 7535014.30 | 373225.23 |
| PW-71A | 10 | 2 | 210.06 | -0.19 | 20.5 | 10.0 | 20.0 | 200.06 | 190.06 | 8/20/1999 | 7534990.35 | 373051.27 |
| PW-72A | 10 | 2 | 210.13 | -0.38 | 20.5 | 10.0 | 20.0 | 200.13 | 190.13 | 8/18/1999 | 7535128.89 | 372874.19 |
| PW-73A | 10 | 2 | 210.86 | -0.4 | 15.5 | 5.0 | 15.0 | 205.86 | 195.86 | 8/18/1999 | 7535270.55 | 372650.23 |
| PW-73B | 10 | 2 | 211.23 | -0.41 | 38.2 | 27.5 | 37.5 | 183.73 | 173.73 | 8/17/1999 | 7535270.55 | 372650.23 |
| PW-74A | 10 | 2 | 209.81 | -0.19 | 15.5 | 5.0 | 15.0 | 204.81 | 194.81 | 8/20/1999 | 7535098.68 | 372580.44 |
| PW-74B | 10 | 2 | 209.64 | -0.39 | 35.5 | 24.8 | 34.8 | 184.84 | 174.84 | 8/20/1999 | 7535098.68 | 372580.44 |
| PW-75A | 10 | 2 | 197.57 | -0.43 | 19.5 | 9.0 | 19.0 | 188.57 | 178.57 | 8/20/1999 | 7535298.17 | 372233.56 |
| PW-76A | 10 | 2 | 207.94 | 2.15 | 19.5 | 9.0 | 19.0 | 198.94 | 188.94 | 9/13/1999 | 7534347.97 | 373929.23 |

## Appendix C. Well Construction Details

*ATI Millersburg Operations, Oregon*

| Station | Well Construction Data | | | | | Screen Depth | | Screen Elevations | | Regulatory Identification | Location Data | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well | Borehole Diameter (inches) | Well Diameter (inches) | TOC Elevations (ft msl) | Stick Up (ft ags) | Bottom of Well Casing (ft bgs) | Top (ft bgs) | Bottom (ft bgs) | Top (ft msl) | Bottom (ft msl) | Date Constructed | Easting | Northing |
| PW-77A | 10 | 2 | 209.03 | -0.4 | 21.5 | 11.0 | 21.0 | 198.03 | 188.03 | 9/14/1999 | 7534294.43 | 373757.10 |
| PW-78A | 10 | 2 | 208.96 | -0.45 | 31.0 | 20.0 | 30.0 | 188.96 | 178.96 | 9/13/1999 | 7534126.15 | 373610.68 |
| PW-79A | 10 | 2 | 198.28 | -0.45 | 21.0 | 9.0 | 19.0 | 189.28 | 179.28 | 9/10/1999 | 7533918.47 | 373475.23 |
| PW-80A | 10 | 2 | 211.03 | 2 | 19.5 | 9.0 | 19.0 | 202.03 | 192.03 | 9/15/1999 | 7534044.51 | 373341.90 |
| PW-81A | 10 | 2 | 208.73 | - | 18.0 | 7.5 | 17.5 | 201.23 | 191.23 | 9/16/1999 | 7534755.97 | 373228.36 |
| PW-82A | 10 | 2 | 208.64 | -0.25 | 19.5 | 9.0 | 19.0 | 199.64 | 189.64 | 9/17/1999 | 7534408.05 | 373148.15 |
| PW-83A | 10 | 2 | 210.28 | - | 22.5 | 12.0 | 22.0 | 198.28 | 188.28 | 9/20/1999 | 7534393.47 | 373051.27 |
| PW-84A | 10 | 2 | 209.7 | - | 20.5 | 10.0 | 20.0 | 199.7 | 189.7 | 8/20/2014 | 7534629.10 | 373054.66 |
| PW-85A | 10 | 2 | 212.85 | - | 20.5 | 10.0 | 20.0 | 202.85 | 192.85 | 9/21/1999 | 7534587.22 | 372962.73 |
| PW-86A | 10 | 2 | 208.91 | -0.24 | 25.5 | 15.0 | 25.0 | 193.91 | 183.91 | 9/20/1999 | 7534745.55 | 372899.19 |
| PW-87A | 10 | 2 | 211.49 | 1.9 | 26.0 | 15.0 | 25.0 | 196.49 | 186.49 | 9/15/1999 | 7534905.97 | 372860.65 |
| PW-88A | 10 | 2 | 211.89 | - | 32.5 | 20.5 | 30.5 | 191.39 | 181.39 | 9/22/1999 | 7534724.72 | 372749.19 |
| PW-89A | 10 | 2 | 202.4 | 2.9 | 15.5 | 5.0 | 15.0 | 197.4 | 187.4 | 10/4/1999 | 7534450.76 | 372811.69 |
| PW-91A | 6 | 2 | 198.19 | -0.5 | 19.3 | 9.0 | 18.8 | 189.19 | 179.39 | 2/22/2000 | 7535257.01 | 372357.52 |
| PW-92A | 6 | 2 | 208.77 | -0.5 | 20.5 | 10.0 | 20.0 | 198.77 | 188.77 | 2/22/2000 | 7534077.85 | 373159.61 |
| PW-93A | 8 | 4 | 209.95 | 0.5 | 30.0 | 7.5 | 27.5 | 202.45 | 182.45 | 9/21/2007 | 7535168.19 | 373072.90 |
| PW-94A | 8 | 4 | 210.03 | 0.5 | 30.0 | 7.5 | 27.5 | 202.53 | 182.53 | 9/21/2007 | 7535141.84 | 373030.99 |
| PW-95A | 8 | 4 | 210.81 | 0.5 | 30.0 | 7.5 | 27.5 | 203.31 | 183.31 | 9/21/2007 | 7535182.90 | 372991.16 |
| PW-98A | 4 | 2 | 209.15 | -0.35 | 16.0 | 11.0 | 16.0 | 198.15 | 193.15 | 7/6/2009 | 7534423.23 | 373594.35 |
| PW-99A | 4 | 2 | 207.44 | -0.35 | 15.0 | 10.0 | 15.0 | 197.44 | 192.44 | 7/7/2009 | 7534497.11 | 373292.22 |
| PW-100A | 4 | 2 | 210.34 | - | 27.3 | 7.0 | 27.0 | 203.34 | 183.34 | 8/12/2010 | 7535148.05 | 373087.94 |
| PW-101A | 4 | 2 | 210.67 | - | 25.0 | 11.0 | 25.0 | 199.67 | 185.67 | 8/11/2010 | 7535204.91 | 373057.24 |
| PZ-1A | 8 | 2 | 210.82 | 2.5 | 18.4 | 6.4 | 16.4 | 204.42 | 194.42 | 5/2/1989 | 7534301.07 | 373180.84 |
| Farm Ponds Area | | | | | | | | | | | | |
| HW | 6 | 3 | 238.5 | 0 | 35.0 | 15.0 | 25.0 | 223.5 | 213.5 | 8/31/1979 | 7533949.00 | 377832.00 |
| ND | 6 | 3 | 232.85 | 2.65 | 57.0 | 53.0 | 57.0 | 177.2 | 173.2 | 1/21/1981 | 7533615.00 | 378572.00 |
| ND-1 | 8 | 4 | 216.86 | 2.36 | 41.5 | 31.0 | 41.0 | 183.5 | 173.5 | 10/5/1983 | 7533127.00 | 378892.00 |
| ND-2 | 8 | 4 | 217.34 | 2.84 | 29.0 | 21.0 | 29.0 | 193.5 | 185.5 | 10/5/1983 | 7533127.00 | 378908.00 |

**Appendix C. Well Construction Details**

*ATI Millersburg Operations, Oregon*

| Station | Well Construction Data | | | | | Screen Depth | | Screen Elevations | | Regulatory Identification | Location Data | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well | Borehole Diameter (inches) | Well Diameter (inches) | TOC Elevations (ft msl) | Stick Up (ft ags) | Bottom of Well Casing (ft bgs) | Top (ft bgs) | Bottom (ft bgs) | Top (ft msl) | Bottom (ft msl) | Date Constructed | Easting | Northing |
| NS | – | 3 | 221.15 | 2.65 | 12.0 | 8.5 | 12.0 | 210 | 206.5 | 8/31/1979 | 7533520.00 | 378619.00 |
| PW-35A | 8 | 4 | 234.99 | 1.89 | 45.0 | 33.0 | 43.0 | 200.1 | 190.1 | 7/28/1988 | 7534545.00 | 377533.00 |
| PW-36A | 8 | 4 | 235.99 | 2.79 | 27.0 | 15.0 | 25.0 | 218.2 | 208.2 | 8/9/1988 | 7535114.00 | 377834.00 |
| PW-37A | 8 | 4 | 227.32 | 2.52 | 38.0 | 24.6 | 34.6 | 200.2 | 190.2 | 8/11/1988 | 7535131.00 | 378206.00 |
| PW-38A | 8 | 4 | 223.04 | 1.84 | 33.9 | 26.9 | 31.9 | 194.3 | 189.3 | 7/12/1988 | 7534300.00 | 378544.00 |
| PW-39A | 8 | 4 | 238.7 | 2.9 | 45.8 | 33.8 | 43.8 | 202 | 192 | 7/1/1988 | 7534078.00 | 378015.00 |
| PW-40A | 8 | 4 | 217.17 | 1.67 | 42.4 | 30.0 | 40.0 | 185.5 | 175.5 | 3/21/1989 | 7532997.00 | 377816.00 |
| PW-40S | 8 | 4 | 217.51 | 2.01 | 18.0 | 11.0 | 16.0 | 204.5 | 199.5 | 3/22/1989 | 7533007.00 | 377815.00 |
| PW-43A | 8 | 4 | 214.12 | 1.92 | 40.1 | 28.1 | 38.1 | 184.1 | 174.1 | 8/22/1990 | 7532599.00 | 377934.00 |
| PW-43S | 8 | 4 | 214.35 | 2.35 | 17.6 | 10.6 | 15.6 | 201.4 | 196.4 | 8/23/1990 | 7532600.00 | 377916.00 |
| PW-44A | 8 | 4 | 214.4 | 2.6 | 34.9 | 22.4 | 32.4 | 189.4 | 179.4 | 8/29/1990 | 7532629.00 | 377567.00 |
| PW-44S | 8 | 4 | 214.44 | 2.54 | 16.7 | 9.2 | 14.2 | 202.7 | 197.7 | 8/30/1990 | 7532625.00 | 377548.00 |
| PW-64A | 6 | 2 | 212.93 | 1.15 | 38.5 | 28.0 | 38.0 | 183.78 | 173.78 | 9/27/1999 | 7533224.00 | 377576.00 |
| PW-64S | 10 | 2 | 212.96 | 2.9 | 17.0 | 7.0 | 17.0 | 203.06 | 193.06 | 9/23/1999 | 7533206.00 | 377582.00 |
| PW-65A | 6 | 2 | 212.52 | 2.3 | 38.0 | 27.5 | 37.5 | 182.72 | 172.72 | 9/28/1999 | 7532990.00 | 377595.00 |
| PW-65S | 10 | 2 | 213.06 | 2.5 | 16.0 | 5.0 | 15.0 | 205.56 | 195.56 | 9/23/1999 | 7532980.00 | 377589.00 |
| PW-66A | 6 | 2 | 211.46 | 2 | 37.0 | 27.0 | 37.0 | 182.46 | 172.46 | 9/24/1999 | 7532585.00 | 378133.00 |
| PW-66S | 10 | 2 | 211.36 | 2 | 16.0 | 5.0 | 15.0 | 204.36 | 194.36 | 9/24/1999 | 7532585.00 | 378148.00 |
| PW-67A | 6 | 2 | 215.18 | 2.2 | 37.5 | 27.0 | 37.0 | 185.98 | 175.98 | 9/23/1999 | 7532559.00 | 378489.00 |
| PW-67S | 10 | 2 | 212.71 | 2.5 | 16.0 | 5.0 | 15.0 | 205.21 | 195.21 | 9/23/1999 | 7532563.00 | 378491.00 |
| PW-104S | 3.25 | 2 | 222.76 | 2.61 | 20.2 | 15.0 | 20.0 | 205.15 | 200.15 | 8/27/2015 | 7533516.11 | 377800.84 |
| PW-105S | 3.25 | 2 | 218.52 | 2.5 | 20.4 | 15.0 | 20.0 | 201.02 | 196.02 | 8/27/2015 | 7533450.80 | 377686.14 |
| PW-106S | 3.25 | 2 | 219.55 | 2.64 | 19.7 | 15.0 | 20.0 | 201.91 | 196.91 | 8/27/2015 | 7533508.54 | 377647.30 |
| PW-107S | 3.25 | 2 | 220.65 | 2.42 | 20.0 | 15.0 | 20.0 | 203.23 | 198.23 | 8/26/2015 | 7533566.64 | 377665.92 |
| PW-108A | 3.25 | 2 | 223.58 | 2.73 | 42.2 | 37.0 | 42.0 | 183.85 | 178.85 | 8/25/2015 | 7533557.98 | 377798.48 |
| SD | -- | 3 | 227.51 | 1.81 | 42.0 | 39.0 | 42.0 | 186.7 | 183.7 | 1/20/1981 | 7533538.50 | 377806.76 |
| WD1 | 8 | 4 | 220.45 | 0.55 | 47.0 | 34.0 | 44.0 | 185.9 | 175.9 | 10/5/1983 | 7532967.00 | 378273.00 |
| WD2 | 8 | 4 | 220.6 | 0.9 | 34.0 | 24.0 | 34.0 | 195.7 | 185.7 | 10/5/1983 | 7532966.00 | 378289.00 |

**Appendix C. Well Construction Details**

*ATI Millersburg Operations, Oregon*

| Station | Well Construction Data | | | | | Screen Depth | | Screen Elevations | | Regulatory Identification | Location Data | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well | Borehole Diameter (inches) | Well Diameter (inches) | TOC Elevations (ft msl) | Stick Up (ft ags) | Bottom of Well Casing (ft bgs) | Top (ft bgs) | Bottom (ft bgs) | Top (ft msl) | Bottom (ft msl) | Date Constructed | Easting | Northing |
| WS | – | 3 | 220.37 | 0.97 | 12.0 | 8.0 | 12.0 | 211.4 | 207.4 | 8/31/1979 | 7532965.00 | 378237.00 |
| Solids Area | | | | | | | | | | | | |
| PW-07 | 10 | 6 | 205.8 | 0.7 | 25.0 | 21.0 | 22.0 | 184.8 | 183.8 | 12/6/1978 | 7533432.40 | 373282.82 |
| PW-09 | 6 | 4 | 200.13 | -0.47 | 20.7 | -- | -- | 200.13 | 200.13 | 5/19/1981 | 7532784.00 | 372877.57 |
| PW-17B | 8 | 4 | 184.14 | 2.64 | 23.5 | 11.5 | 21.5 | 172.64 | 162.64 | 3/22/1989 | 7531945.95 | 373641.05 |
| PW-18B | 8 | 4 | 188.24 | 2.34 | 26.3 | 14.3 | 24.3 | 173.94 | 163.94 | 3/20/1989 | 7532111.29 | 373239.05 |
| PWA-1 | 10 | 2 | 192.82 | 1.12 | 25.0 | 19.0 | 24.0 | 173.82 | 168.82 | 8/4/1982 | 7532370.65 | 373535.69 |
| PWA-2 | 10 | 2 | 193.04 | 1.34 | 38.0 | 31.0 | 38.0 | 162.04 | 155.04 | 8/4/1982 | 7532370.65 | 373535.69 |
| PWB-1 | 10 | 2 | 182.9 | 2.1 | 13.0 | 9.2 | 13.0 | 173.7 | 169.9 | 8/2/1982 | 7532711.06 | 373252.02 |
| PWB-2 | 10 | 2 | 182.94 | 2.14 | 42.0 | 25.0 | 37.0 | 157.94 | 145.94 | 8/2/1982 | 7532711.06 | 373252.02 |
| PWB-3 | 10 | 2 | 182.86 | 2.06 | 68.0 | 58.0 | 68.0 | 124.86 | 114.86 | 8/2/1982 | 7532711.06 | 373252.02 |
| PWC-1 | 10 | 2 | 202.69 | 1.39 | 29.0 | 16.0 | 26.0 | 186.69 | 176.69 | 8/3/1982 | 7533153.59 | 373274.71 |
| PWC-2 | 10 | 2 | 202.65 | 1.35 | 65.0 | 50.0 | 60.0 | 152.65 | 142.65 | 8/3/1982 | 7533153.59 | 373274.71 |
| PWD-1 | 10 | 2 | 192.51 | 1.91 | 37.0 | 31.0 | 37.0 | 161.51 | 155.51 | 7/30/1982 | 7532438.73 | 372929.44 |
| PWD-2 | 10 | 2 | 192.49 | 1.89 | 72.0 | 60.0 | 70.0 | 132.49 | 122.49 | 7/30/1982 | 7532438.73 | 372929.44 |
| PWE-1 | 10 | 2 | 190.5 | 2.1 | 24.0 | 12.0 | 22.0 | 178.5 | 168.5 | 7/30/1982 | 7532683.50 | 372982.93 |
| PWE-2 | 10 | 2 | 190.53 | 2.13 | 46.5 | 32.5 | 42.5 | 158.03 | 148.03 | 7/30/1982 | 7532683.50 | 372982.93 |
| PWF-1 | 10 | 2 | 204.76 | 0.96 | 22.0 | 17.0 | 22.0 | 187.76 | 182.76 | 8/3/1982 | 7533442.12 | 372992.66 |
| PWF-2 | 10 | 2 | 204.68 | 0.88 | 54.0 | 39.0 | 49.0 | 165.68 | 155.68 | 8/3/1982 | 7533442.12 | 372992.66 |

**Notes:**

[1] Elevation measured to top of well cap

[2] PW-14 well log contains only top of casing elevation and ground surface elevation. No other information is present.

-- = not available

ft ags = feet above ground surface

ft bgs = feet below ground surface

ft msl = feet above mean sea level

TOC = top of casing